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# West Europe Report

SCIENCE AND TECHNOLOGY



FOREIGN BROADCAST INFORMATION SERVICE

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23 August 1985

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AEROSPACE

ARIANESPACE COMMERCIAL DIRECTOR ON COMPETITION

Amsterdam ELSEVIERS WEEKBLAD in Dutch 8 Jun 85 p 15

[Interview with Jean-Claude Biget, commercial director of Arianespace, by Willem Kraan of ELSEVIERS WEEKBLAD: "After First Failures Ariane Is Now a True World Leader"; date and place not specified]

[Excerpts] In the cut-throat competition between the American space shuttle and the European Ariane rocket, it must suit the Europeans that the [American] Space Shuttle is losing one satellite after another. But Jean-Claude Biget, commercial director of Arianespace, shows no signs of malicious pleasure at these mishaps. He is quietly reaping the fruits of "French relentless insistence."

"Nationalistic and emotional factors count in space travel."

"How do you mean that? Can you be a little more clear?"

Jean-Claude Biget, the commercial director of Arianespace, acts as innocent as a newborn babe when asked if he does not laugh himself silly when watching the many television broadcasts on the Space Shuttle flights. Although Arianespace, the commercial operator of the European Ariane rocket, is involved in cut-throat competition with NASA, the organization that promotes the commercial services of the American space shuttle, the two organizations continue to exchange courtesies. Each failed attempt to launch a satellite from the space shuttle is consequently accompanied by European condolences, just as the initial failures of the Ariane were met with polite signs of American regret.

[Question] But Mr Biget, every time the Space Shuttle loses another \$200 million satellite, you can bring out your order book. Surely those moments are festive ones, aren't they?

[Answer] Not at all. We are not at all happy with any failure. All these difficulties after all have serious consequences for the credibility of the space industry. Moreover, every lost satellite sends insurance premiums up, and that's a source of trouble for us as well.

[Question] And yet you have been able to pull in some orders solely because of the failed launches of several satellites from the space shuttle.

[Answer] Yes, it is obvious that competition could have been tighter. But as things now stand, it's difficult enough, because not only technological and economic factors count in space travel, but also nationalistic and emotional factors.

[Question] That is why Arianespace is having difficulty gaining access to the American market?

[Answer] That plays a role, yes. Nevertheless, we have indeed launched several American satellites and of our present order file containing 32 satellites to be launched, a quarter of them are American commissions.

#### Rock-Bottom Prices

[Question] In spite of the prices that NASA charges for a Shuttle launch. These are in fact described as rock-bottom prices. What do you think of that?

[Answer] I don't think anything. I just look at the facts. From a study commissioned by the U.S. Congress, it appears that the average cost of a Shuttle launch amounts to between \$200 and 250 million. This is compared to revenue of \$35 million (Ariane: \$50 million). This is the cost charged by the Americans for putting a satellite into low orbit. At the end of this year, this price will be increased to \$71 million. In order to make a fair comparison, we must also consider that the cost of a launch goes down with a rise in the number of launches. And it is a fact that that number will rise sharply when the fourth Space Shuttle, the Atlantis, goes into service next year. With 24 launches a year, the real costs are \$106 million, and at 18 starts \$126 million per launch. Let there be no misunderstanding: these are official, public data. So it is clear that the Americans are below the prime cost.

[Question] The first Ariane flights did not exactly cover costs either.

[Answer] No, the first eight didn't. Those flights were conducted by the ESA [European Space Agency]. Four test flights and four launches for promotional purposes. But after that, the Ariane was transferred to Arianespace, a purely commercial organization with shareholders who want to see dividends. We are now making a modest profit, and we want to raise that in order to increase our reserves. Thus, we will in fact have to charge reasonable prices.

#### Enthusiasm

Jean-Claude Biget: "Enthusiasm is so great that most of the participating countries are no longer satisfied with a modest contribution. Future projects should actually be larger than 100 percent."

Once upon a time, things were different. On two occasions, an Ariane rocket exploded shortly after takeoff. Calls to simply scrap the European program and buy dependable American rockets were heard loudly at that time. But the French insisted on having their way, and they are now reaping the fruits.

The launching of communications satellites has become a full-grown branch of industry.

Biget: "It already accounts for 75 percent of the market, and it will only grow larger since besides data and telephone signals, more and more video and television signals have to be transmitted. The end to this is not in sight. Satellites assisting in observations of the earth, weather forecasting and navigation account for about 10 to 15 percent of the whole. But that market is not yet full-grown, meaning that you can't base a profitable branch of industry on it yet."

"Scientific satellites will always continue to claim a modest share [of the market], but satellites for the manufacture of new materials are in for a big future. The Americans are predicting a market of about \$50 billion by the end of this century. I think that's a little exaggerated, but it's obvious that it's a growth market."

Jean-Claude Biget worked for the French aircraft manufacturer Dassault for 17 years, and in the telecommunications industry for 3 years. Last year he made the jump to Arianespace. He says with satisfaction that he has no regrets. But because he has still only been there for a short time, he cannot be talked into posing for a photograph.

"Absolutely not. For the time being I want to keep a low profile."

Biget, 43, also dresses with that in mind. Inconspicuous gray suit, inconspicuous shirt, ditto on the necktie. Only the frames of his glasses, with the conspicuous green Lacoste alligator, catch the eye.

12271

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## AUTOMOBILE INDUSTRY

### FULLY AUTOMATED FIAT ENGINE PLANT IN TERMOLI

Zurich DIE WELTWOCHE in German 13 Jun 85 p 23

[Article by Johannes von Dohnanyi: Fully Automated Fiat Engine Plant in Termoli: 100 Robots, 700 Computers and 950 Inspectors. The Iron Colleague has Nothing Against Profit]

[Text] At first glance, the prospects are terrific. The helpful automatic machines which are being installed on the factory floors by the processing industry at an increasingly quickening pace, not only work quietly and with a consistent precision unknown so far. They also relieve man from a lot of hard physical labor which up to now had been considered to be the curse of the industrial worker. In three generations, the "thinking" machines underwent an evolution which took man tens of thousands of years. The latest industrial robots "see" and "feel," can distinguish objects and can perform several work processes with their arms that can be pivoted in any direction. And as their inventors promise, the development has just begun.

The Italian Fiat concern is using the best that is currently available on the robotics market in its new engine factory Termoli 3 South of Pescara on the Adriatic coast. Approximately 100 industrial robots which are controlled by approximately 600 personal computers and 100 medium-sized computer systems are responsible for the daily production of up to 2,500 of the new type FIRE engines. FIRE stands for "fully integrated robotized engine," which means that the engine is never touched by a human hand from its start through the assembly of a great number of individual parts up to the final check-out. "Here, no item leaves the plant that does not function perfectly," says Termoli director De Angelis. Because in contrast to conventional production methods the new Fiat factory tests not only the end product; each work phase is followed by a strict quality control.

The work flow is impressive and depressing at the same time. The Camions arriving at a dock are unloaded automatically. The individual parts are sorted automatically and brought to their positions at assembly line. The line is fed automatically, and from its end a finished motor is transported to the fully automated testing chambers every 20 seconds.

The 620 billion lire which Fiat invested in the new factory in Termoli with the aid of public funds from the "Cassa per il Mezzogiorno" seem to pay off,



at least in an economic sense. From 231 minutes needed at a conventional assembly line, the production time for the FIRE engine was almost cut in half to 124 minutes. Termoli 3 also proves that today the actual work lies in the planning and development phase of a new factory. Preparation for the new plant started as early as the late seventies. Construction started in January 1985. And not more than four and a half months later production was started.

Termoli 3 is the industry's direct response to the ever increasing vagaries of the market. The first and a few years later a second oil crisis reduced utilization of the Termoli 1 and 2 factories to a minimum. Of the more than 3,000 employees most ended up in the compensation fund which is financed both by the government and by industry and which in the years of the economic crisis actually took over the role of unemployment compensation. While the Cassa Integrazione may prevent the financial catastrophe for the unemployed, it cannot solve the social problems. All the more since FIAT is the most important employer in the region around Termoli. Eventually, the new factory is supposed to employ 1,000 people. The birth of the "worker of the year 2000" requires a lot of time and money.

According to expert calculations, 1.2 million training hours will be necessary to prepare the 950 robot inspectors for their new tasks. Depending on the specialization the courses last between 8 and 12 months. As a rule, young employees with a "strong inclination towards technical innovation" are selected. The new work world for which they are being prepared has very little to do with the traditional concept of a factory. Noise protection has become unimportant to a large extent: The robots work as if they had velvet paws. Rough masonry was replaced by light, friendly colors; the all-glass window fronts provide a view of palms and green lawns. It is no longer a problem to leave the workplace occasionally for a short period: buddy robot continues working without complaint. He does not need a pit stop. But as far as the feeling of self-esteem of the worker of the turn of the millenium is concerned, there are no uniform opinions even among the selected pioneers. He was "no longer a worker, but something else" one of them tries to explain his new status with the inability to express his thought which is a by-product of automation. Behind him on the wall a poster reads: "Quality is the driving force behind sales." The spokesman of a small group which has retreated to the coffee machine, is more forthcoming: "We certainly added to the quality of work. But that does not mean at all that we changed from simple workers to technicians. But the environment is more human. And that is tremendous progress for someone who has to work here for 30 years."

The difference in the work is that physical efforts are no longer necessary. In Termoli the worker controls the screen of his terminal. The computer tells him automatically where in the electronic mechanism the error is. And as long as it is a matter of simple operations, the worker is prepared to carry them out. The monotony of turning screws on the assembly line has been replaced by the monotony of the screen which flickers in a greenish color. However, while previously it was possible to follow the work process at least for a short stretch through the personal contact with the man next to you, the factory of tomorrow lacks communication. The closest--human--inspector is 30 m away. But as the motivational slogans announce, this, after all, is not the question: "Beautiful is not what we like, but what has quality."



"Automation naturally reduces the number of employees;" the workers know that as well as the management of Termoli 3. There are 1,000 workplaces, and they will remain at 1,000. The rest will stay outside. "Termoli 3 is not a factory, but a laboratory," an impressed visitor told the factory newspaper. If the laboratory experiment is successful the future will produce one, two, many Termolis. Then what to do with the "excess" workforce? As Fiat and most other companies which venture the jump into the new technological revolution say, this is less our problem and more that of society. "It is our job to make a profit," Olivetti chief Carlo De Benedetti, for instance, explained the employer position once and for all. And the Fiat authorized representative Cesare Romiti confirms: "Profit is one of the noblest words we know. Society must finally stop despising this word like a leper."

By presenting its consolidated balance sheet for 1984 Fiat proved impressively that the new technologies are profitable. The concern which was still sick at the beginning of this decade has turned into a flourishing enterprise, not least due to the large-scale investments in new manufacturing methods. Tripling profit after taxes to 627 billion Lire in only one fiscal year is something to be proud of. "From a technical and organizational point of view we are again leading worldwide," Romiti commented on the "not good, but exceptionally good result." Investments on the one hand--lay-offs on the other hand: in the Fiat automotive sector alone the number of employees was reduced by one third to 230,000 between 1981 and 1984. "Without these certainly painful decisions we would hardly be able to celebrate the resurrection of Fiat today, but would have to attend its funeral", says the company's top management. Fiat is already working on the future generation of silent servants. And--as one of the developers promises--they will be able to assume all those inspection tasks which are still carried out by man today. Thus, Huxley's nightmare of the "brave, new world" could become a reality as early as tomorrow or the day after tomorrow.

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BIOTECHNOLOGY

DENMARK

#### NEW NOVO GENE SPLICING PLANT IN DENMARK

Copenhagen BERLINGSKE TIDENDE in Danish 12 Jul 85 p 2

[Article: "Approval to Novo for Gene Splicing"]

[Text] The technical and environmental committee of the county council for West Zealand yesterday gave approval to the firm, Novo, to begin construction of a gene splicing plant in Kalunborg. Novo will use the gene splicing technique for producing insulin, and that is the first time this will occur in Denmark.

The new production is due to start in the beginning of 1987, but in the interim, the West Zealand county council, in cooperation with the Environmental Commission, will fix more precise requirements for the plant, advises the county's environmental department.

At the moment, basic evaluations are being made concerning gene splicing in both Danish and international committees, and a committee in the Interior Department will present its views on the subject in mid-August.

Nonetheless, the Environmental Commission already a month ago stated that basic consent can be given for gene-splicing organisms in industrial production in Denmark. The Environmental Commission believes, however, that one must await the views of the committee before final conditions are imposed regarding the spillage of gene-spliced organisms.

Several critics have feared that the artificially created micro-organisms could leak out through the plant's discharged water and cause great damage to the environment. However, Novo finds it acceptable that certain artificial micro-organisms escape. The firm asserts that they will sink quickly without causing damage.

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## CIVIL AVIATION

## FOKKER COMPANY PLANS, MARKET ANALYSIS

Rotterdam NRC HANDELSBLAD in Dutch 12 Jun 85 p 2

[Article by Pieter Graf: "The Market for the Fokker 50 Has Been Well 'Explored': Dutch Aircraft Manufacturer Has at Any Rate One Complete Family of Products"]

[Text] According to Frans Swarttouw, the machine is unbeatable in its class; others in the aircraft industry say that the Fokker 50 seems to be well adapted to the demands of the various airlines. The Dutch aircraft manufacturer now has at any rate one complete family of products--the "50." Market expectations for this type of airplane until the year 2000: around 1,100 units.

On the left side of the note pad, the president of the board of directors of Fokker, Frans Swarttouw, makes a vertical list of numbers ranging from 50 to 110. He draws a horizontal line at the lowest number and says, "We don't want to be below the limit of 50 passengers. That market segment is served by 25 manufacturers, and competition is fierce." Swarttouw also draws a horizontal line at 110. "Above this limit you start running into guys like Boeing, Airbus and McDonnell Douglas. Thus, Fokker should stay out of that market segment as well." This explanation serves as an introduction to his response to the question of what has come of the three Fokker families of products, a wish expressed by Swarttouw in 1981.

At that time, the cooperative effort with McDonnell Douglas--which later fell through--to develop the MDF-100 had just been announced. Drawing on napkins and, when they were gone, on the tablecloth, the president of Fokker sketched neat parabolas to indicate the life cycle of the F-27 and F-28. Through the top of the curves he drew a line that, as he explained it, ought to be as straight as possible or--and this would be best of all--would rise slightly from left to right. The latter would then reflect rising production.

"Look, you launch a new airplane and the curve shoots upward and after the peak--where the line begins its descent--you can prolong the course, in part by adapting the aerodynamics somewhat and providing the machine with new engines. But ultimately it has indeed run its course. At that point, you should already have assured a good ending through the construction of a new

type, so that after cancelling the production of one type you assume the manufacture of a successor with as little shock effect as possible."

#### Fokker Nut

The best way to avoid shocks, Swarttouw said during the aviation show at Le Bourget in 1981, is to have three families of products.

At Le Bourget in 1985, we repeat the question, and the president of Fokker again wields a pen enthusiastically. Pointing to the horizontal line at the bottom of his diagram, he says, "For this we have the Fokker 50," which is followed by several comments on the unbeatable nature of this machine in its class.

Finally he says, "Well, I'm no airplane nut, but I am a Fokker nut." The pen drops to the paper again and Swarttouw puts a dot a little above the number 65. "We could do something there as well," and then almost mumbling, "you could call it a Fokker 70."

The pen then comes to rest at the number 80, for which there is the F-28, and above it the Fokker 100. But we object that just like the F-27, the F-28 is to be taken out of production, and thus Fokker still does not have three lines. That is only partly true, as indicated by Swarttouw's answer. Fokker will indeed concentrate now on the Fokker 50 and 100 and the F-27 will be taken out of production, but "no definite decision has yet been made on the F-28."

The marketing division of Fokker calls the capacity of between 60 and 80 seats "a rather elusive" area at the moment. According to the division, the airlines do not know whether they want a jet or a turboprop for this. A jet is certainly faster, but also uses more fuel. The F-28 will be temporarily shelved once the Fokker 100 is in full production, but if necessary, production [of the F-28] will be resumed. If that turns out to be the case, it can certainly be expected that the newest developments with respect to engines, materials, navigational systems and aerodynamics will be integrated into the F-28.

#### Well Adapted

The Fokker 50 appears to be well adapted to the demands of the various airlines. Many manufacturers have announced that they are coming out with aircraft--in some cases expanded versions of airplanes already on the market--with a capacity comparable to that of the Fokker 50.

De Havilland in Canada wants to extend its Dash-8 (36 passengers) to a Dash-300 for 50 passengers. Short Brothers in Belfast wants to do the same thing with its SD 360, and is talking about an SD 450 with an average capacity of 45 passengers. The Spanish-Indonesian consortium Casa/Nurtanio does not even have its CN-235 (35 to 44 persons) in the air and is already talking about a CN-260, although not even one detail of the machine has been made known.

The French-Italian consortium of Aerospatiale and Aeritalia with its Avion de Transport Regional (ATR) apparently gambled too low with its capacity of 44 passengers. There is already talk there of an ATR 42 ST (Stretched), intended to transport 66 to 70 passengers.

Just like the Fokker 50, the ATR 42 ST will also be equipped with the economical PW 124 turboprop engines by Pratt & Whitney. De Havilland and British Aerospace (BAe) have similarly selected these engines. BAe did so for its ATP (Advanced Turboprop--approximately 60 passengers), which is to make its first test flight on 6 August and is intended as a successor to the HS-748.

The HS-748 was a direct competitor of the F-27, and the ATP should be the same thing for the Fokker 50. Fokker is not apprehensive about the ATP, because the Dutch aircraft manufacturer is convinced that it has designed a better and more economical machine. It is also pointed out that there is an extremely small number of orders for the ATP thus far. There have been a total of seven, two from the Caribbean airline Leeward Islands Air Transport and five from the British Midland Group. For the time being, Fokker need not worry at all about the ATR 42 in its extended version, because this machine will not take to the skies until 1988 at the earliest.

#### Seventy Seater

While the small aircraft manufacturers are applying pressure from below and saying that they want to build larger machines, there are also manufacturers who see a market for a 70 seater. Besides the ATR 42 ST and the Advanced Turboprop, which by shifting the distance between the seats can easily be made suitable for the transport of 70 passengers, there is at least one other company that sees a gap in the market here.

The Allison gas turbine division of General Motors builds no airplanes itself, but has set up a program that should result in what is being called the "Allison Flagship." This involves a conversion program for the Convair (CV) 580. It can be concluded from an Allison brochure that it concerns the conversion of airplanes of the type 340/440, which were later lengthened into the CV 580.

KLM flew the CV 340 from 1953 until 1964. The expansions that resulted in the CV 580 (approximately 56 passengers) were carried out between 1965 and 1968. Nevertheless, Allison sees money in it, and the Convair division of General Dynamics, whose products include the F-16 fighter, has been commissioned to do the drafting work for modifications in those CV 580s still in existence.

Some 170 of them were manufactured, and about 150 of them are still flying, primarily for American regional airlines. Allison has developed an adapted economical turboprop and estimates that no less than 100 airplanes will be offered for conversion which will then at the same time be fitted with a four-bladed propeller by United Technologies subsidiary Hamilton Standard. As an advantage of this propeller, Allison cites the experience gained with it on the Lockheed Orion P-3C.



At the end of July, Allison will announce which aircraft builder in the United States will undertake the conversion. Certification of the "Allison Flagship" is expected in September 1986. "We are obviously competing with new airplanes that are going to be coming on the market," says R. H. Duzan, Allison's sales manager for large aircraft engines. "New airplanes will be more expensive than our conversion."

The General Motors subsidiary has calculated that the conversion of a CV 580 should cost approximately \$75,000 per seat, which comes to about 19 million guilders for the 72-seat "Flagship." This is certainly cheaper than a Fokker 50, which in the present basic configuration will cost 25 million guilders, while the British Aerospace ATP should cost something like 32 million guilders.

Of course, Fokker has been less lighthearted in examining this gap than the company would apparently have one believe. In the brochure "Aircraft Overview Fokker 50," which is intended for potential customers, the Fokker 50 in an extended version with a basic set-up of 66 seats is depicted on page 46 under the "standard" design implementation and the one with an extra cargo door. That number of seats can easily be increased to approximately 75.

Further inquiries of Fokker reveal that the manufacturer does not yet see the market for 70 seaters, but that should the demand for these machines arise it can easily cater to desires. The same is true for a maritime version of the Fokker 50. Hans Groetterud of the regional Norwegian company Busy Bee, who said recently at Le Bourget that he is very interested in a Fokker 50 Maritime, can, if he so desires, have his wish attended to.

Fokker designers have already assimilated their experiences with the F-27 Maritime into the Fokker 50. Thus, at least one family of products--that of the Fokker 50--is complete. Fokker estimates the market for this type of aircraft until the year 2000 at approximately 1,100 machines, including military variations.

At the other end of the Fokker spectrum is the Fokker 100, for which a demand of approximately 850 airplanes will exist until around the turn of the century, according to the company's market analysts. One competitor in this market segment currently is the BAe 146, a four-engine jet with a capacity of "100 or fewer" passengers.

### "Monster"

People at Fokker talk scornfully of the "monster" that only saw the light of day because the British labor unions demanded its construction in order to preserve employment. The only advantage to the four engines is supposedly a reduction in noise.

It is also pointed out at Fokker that the two Tay jet engines by Rolls Royce with which the Fokker 100 is equipped amply satisfy all environmental requirements pertaining to noise. In addition, the Tay engines are extremely economical, and two engines demand less maintenance than four, according to Fokker.

And then there is the aircraft manufacturer Boeing, which from time to time makes noises indicating interest in the market for 100 seaters. However, in concrete terms, Boeing, which according to Swarttouw "is conducting first-rate soundings," has not come up with anything in this area. The roar of this lion against Airbus concerning the 150 seater appears for the time being to be more serious than challenges to Fokker.

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## COMPUTERS

### EUROPEAN ACTIVITIES IN OPTICAL COMPUTER DEVELOPMENT

Duesseldorf WIRTSCHAFTSWOCHE in German 7 Jun 85 pp 84, 87-88

[Excerpts] The race to the light optopia has long begun. The starting holes this time are also filled by European researchers to develop the fast breeder of the electronics branch, the optical computer.

"Basically it works. But nobody knows exactly how." Professor Herbert Walther, director of the Max Planck Institute for Quantum Optics in Garching near Munich warns against premature hopes in the leap into the fast light era. Very optimistic, on the other hand, is Desmond Smith, his research colleague in the physics school of Heriot Watt University in Edinburgh. He has promised still for this year the prototype of a light computer.

The dream of a faster computer generation based as much as possible on a new technology has obsessed researchers since the end of the sixties. They are afraid, probably rightly, of soon running into the performance limits of classical electronics. The end of the electronic standard may be a long way off, but the alternative of light instead of electricity is obviously casting its shadows. "Although it is still too early to say whether and to what extent optical computers will ever replace traditional systems," Pierre Meystre, Walther's colleague, does not doubt that the age of light is coming: "No basic problems or limitations have appeared so far."

The knowledge of an optical switch capability is still brand new. American scientists first predicted the phenomenon of so-called bistability in 1969. But it was another seven years before researchers at Bell Laboratories proved this phenomenon experimentally for the first time.

EJOB, European Joint Optical Bistability, then also refers to the EC [European Community] research program, in which eight European institutions and universities are taking part, underway since 1984 and limited to just two years. In the Federal Republic, besides the Max Planck Institute for Quantum Optics, Frankfurt University and the Fraunhof Institute for Physical Metrology in Freiburg are also participating in the project.

But managing the effort is the University of Edinburgh with its advanced scholar, Smith, who has access to about a third of the authorized \$1.45 million research fund. Faced with the intensive American and Japanese efforts in this research area, Meystre considers this support a "trifling sum" if, besides basic research, development of the optical computer is also to be speeded up. The University of Arizona Optical Center alone has an annual budget equal to this amount. If EJOB expires at year's end, Meystre will then continue his research in Arizona. So far, there has been no signal from Brussels that a continuation is planned within the European framework.

Professor Walther is still convinced that in some areas of basic optical research, Europeans can not only hold their own internationally, but are even leading. But that could change, he worries, when it comes to further development of optical computers, switches and amplifiers for commercial use. "Industry is especially challenged here. Comparable efforts similar to the megabit project have to be made in the optical area."

The success of European Community research now emerging in the EJOB project is just a promising first step. Even if the prototype of an optical computer is soon to come into the world in the Edinburgh light shop, it will be no radiant wonder, but rather a faint reflection of future computer magnificence. "It will be about as much use as an abacus," the Max Planck researcher summarized the foreseeable capabilities of the light computer, which for the moment can compete neither in size nor performance with today's microcomputers.

But for the scientists, it is a question of showing that the principle works. Their thesis: If the primitive computer based on light gets in the running, then it is basically not in the way of the journey to optopia anymore. "In ten years, there will be a high-performance optical computer, for example, for the image processing which is technically difficult to accomplish today," Walther and Meystre are convinced. The capabilities of such a computer, which strike us as theoretically so fantastic, are indeed also those which are puzzling the still small worldwide band of optical computer experts.

For logical circuits controlled by light also have the fascinating capability of processing thousands of bits of information simultaneously. While today's chips process exactly only one signal at any time, transphasors can simultaneously execute many switching operations with parallel laser beams. "This is the real sensation and at the same time, our biggest problem," Professor Walther summed up. For computers which do not work off the instructions one after another in well-behaved fashion must be built according to completely new logical principles compared to the standard systems of today. Optical circuits are now also laid out according to the usual pattern of classical computer architecture, the fundamental principles of which were developed long ago by John von Neumann.

Computer experts also lament as a Neumann bottleneck the fact that, even if with tremendous speed, just one bit after the other is processed at a time. Such architecture is not suited to parallel processing, if one wants to exploit the advantage of simultaneity.

Researchers at Bell Laboratories and other American institutes have just recently begun the effort to tackle this decisive problem. Experts in this area are rare, directly in the Federal Republic. Indeed, Professor Adolf Lohmann of the University of Erlangen-Nuernburg wants to set up a national think tank to track the new computer logic, but Walther fears that the American know-how in this area can already today no longer be caught up to.

He believes there are more chances for Germans and Europeans in physical research for optical circuits. For the optimal semiconductor material to make optical VLSI circuits which are housed in the smallest space and operate at ambient temperature has still not been found. Great hopes are now being placed in thin film epitaxy with which, among others, the Max Planck Institute for Solid State Physics in Stuttgart is also experimenting: Various extremely thin semiconductor plates are evaporated together to improve the physical properties by the combination effect.

The electronic brains are not yet in danger of being replaced by optical supercomputers. But the progress already achieved in the telecommunication area especially makes evident the strong requirement for purely optical components, amplifiers and computers. Thus, the advantages of super fast, very thin, glass fibers are fully given a chance only when the light signal must no longer pass through the electronic bottleneck. For to regenerate optical signals on long communication routes or further process optical data, the optical information must repeatedly be converted into electrical pulses. These intermediate steps will in future be decomposed into light.

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## COMPUTERS

### FINNISH COMPUTER, MICROCHIP R & D SURVEY

Helsinki HELSINGIN SANOMAT in Finnish 18 Jun 85 p 23

[Text] The big American computer firm Mohawk Data Sciences' (MDS) six European subsidiaries are being transferred to Nokia ownership. The MDS subsidiaries' sales volume this year is estimated at \$58 million, or 365 million markkas. A total of 700 people are employed by the subsidiaries.

Nokia electronics director Timo H.A. Koski said that, when the deal is concluded, it will be of particular importance for Nokia, which will through it obtain sales channels for its own data systems to Western Europe, particularly West Germany and France. Even after the sale, the subsidiaries will continue to sell MDS terminal systems in the countries in question. In addition to the above-mentioned, subsidiaries operating in the Netherlands, Belgium, Sweden and Denmark will be transferred to Nokia.

The sale will be officially confirmed by 13 July. Actually, Nokia has sent its bid for the subsidiaries that are for sale. At this point Nokia has no serious competitors.

According to director Koski, the "waiting period" means that Nokia is reviewing the condition of the companies.

Like many other American firms, MDS has decided to divide up its activities.

The West German subsidiary is the biggest and it employs 300 people. Nokia will be getting ready-made organizations for its data system in Central Europe and a unit that will consolidate its service activities in Sweden.

Nokia has bought Europe's leading manufacturer of auto radiophone filters, a majority share of the Lauri Kuokkanen Company. The firm operates in Kempele and employs 140 people. Half of the production goes into exports and the customers are radiophone factories in Europe and the Nordic countries.

The company has grown substantially over the past few years and they have begun to expand the operations plant this summer.

The founder of the firm, Lauri Kuokkanen, will stay on as chairman of the board and technical director. Tapio Takalo will continue to be general manager.

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FACTORY AUTOMATION

FRG'S RIESENHUBER ON AVAILABILITY OF FUNDS FOR ROBOT USERS

Landsberg ROBOTER in German April 1985 pp 14-15

[Interview with Dr Heinz Riesenhuber, FRG minister of research and technology: "Robot Users Left High and Dry?"; date and place not specified]

[Text] Money from Bonn could inspire robot users to try new areas of endeavor. But Dr Heinz Riesenhuber, minister of research and technology, favors offering free advice to the individual companies rather than financial support.

Since the beginning of 1974 any company in the FRG which became involved in the development of robots or their applications could in principle make the necessary application and receive support funds from the BMFT (Federal Ministry for Research and Technology). Two consecutive working group programs covering a period of nine years involved a total sum of DM 64 million. The first working group, Arge 1, had a DM 29 million fund for "humanizing the working world." Its successor, Arge 2, had as its objective the "development of new areas of application and the expansion of technology". This group concluded its activities in 1984, thus shutting off for good the supply of money for these projects. But new sources of funds have already been found. However, most of them benefit manufacturers rather than users.

[Question] Mr Minister, the results of these support programs have shown that our industry, in part due to unsuccessful developments, has scarcely been able to profit from these projects. In view of the robots developed as a result of Arge 1, the project would have to be considered a complete failure. And also with Arge 2, transferability to other areas of application, which federal support always requires, is questionable. What companies and branches of industry have been able to benefit from these projects?

[Answer] You yourselves, in an earlier article in your magazine, evaluated the results of these government projects from your own point of view and came to a positive conclusion in writing that, without the development efforts of the working group, robot technology in the FRG would never have become as widespread as it has. And it is certainly true that a humanized approach to the employment of robots has been promoted by the working group.

Policy aims regarding government support are to provide assistance and an overall framework in which problems can be solved by those directly affected and in which structures are developed which will maintain themselves and continue to grow under their own power. I share your view that this has been achieved by the two working groups. In the final analysis all companies and employees involved in innovation will benefit from this in that they can learn how to employ new technologies using a humanized approach.

[Question] It is noteworthy that the primary driving force behind our economy, namely the automobile industry and its suppliers, was indirectly provided with BMFT money. And yet in the near future high sales figures for robots can no longer be expected in this branch of industry. Outside the automobile industry robots are employed relatively infrequently even though their benefits can scarcely be denied. What can the BMFT do to make the new robot technologies now available useable in conjunction with the peripheral products developed by our KMU's (small and medium-sized companies) in these government support programs?

[Answer] At the beginning of the 1970's the industrial robots available and in use in the FRG were almost exclusively foreign made. Today, however, there are numerous German firms which not only sell robots and corresponding accessories but also account for a considerable number of exports. This is of course not the result of support for research alone. But it is certainly no coincidence that a large number of companies which are very strong in the German robotics market today were also partners in this working group and now, after the support has ended, continue to work together at times. In terms of customers, the automobile sector has a very strong position, but there are also a large number of small and very small firms outside the automobile sector which employ robots. For small and medium-sized companies, however, it is often more important at this time to obtain information and advice on which technologies can be most effectively employed in their operations. It must be kept in mind that progress in innovation is greatly enhanced by intelligent interaction between technology and labor organization.

[Question] The "Program for Manufacturing Technology (PFT)" begun by the BMFT in 1983 provides a backup of financial infusions to small and medium-sized companies for the development of modern manipulating devices and industrial robots. But robot suppliers are already complaining that they can hardly sell their products at all outside the automobile industry, or only with large price cuts. It appears that the idea of technology transfer in the case of the KMU's has fallen on infertile ground. What is causing the reservations among these companies regarding new types of technology and how can they be eliminated?

[Answer] One measure involved in the PFT program, which was adopted by the government cabinet for the years 1984 to 1987, is indirect-specific support for the development of industrial robots. This measure is intended to expand the industrial base in this area of technology. An essential feature of this type of support is that the decisions of the individual companies as to product development are based on forces within the marketplace. By the end of

1984 about 200 companies had taken advantage of this offer of support; this shows that these companies see a growing market in this area.

At the end of 1984 about 6600 industrial robots were in use--that is 1800 more than at the end of 1983. In terms of figures this was the largest annual increase ever. It is correct that industrial robots are currently used primarily in large companies--above all in the automobile industry. However, these products are also being employed increasingly in small and medium-sized companies. I do not think that these companies can be accused of having reservations about the use of new technologies.

[Question] What concrete measures have already been taken to make the new technologies more attractive and what is meant in general by the slogan "the humanized approach to applying new technologies"?

[Answer] Past experience has shown that it is a difficult and involved process to subsequently adapt technologies which only inadequately take into account the needs of the people who use them. Designing new technologies to be people-oriented early on in the developmental and introductory phase promises much greater success. This aim is an essential feature of the new orientation of the HDA [expansion unknown] program which appears in the April 1983 government report to the Bundestag. This report documents the concrete measures involving the main points of support for applications of new technologies in production and in administrative and other offices. I would appreciate it if you would also provide your readers with an in-depth report on the main points of this support which have been published in the federal register.\*

[Question] The Consultation Center for Industrial Robots (BZI) at the Fraunhofer Institute for Production Technology (IPA) in Stuttgart can of course only be considered a first step toward "employment of robots in KMU's." Financial infusions, even small ones, would provide the KMU's with a greater incentive to employ robots than would free advice, since they, too, make offers free of charge. What do you see in the way of further concrete BMFT measures?

[Answer] The BZI also gives the KMU's the opportunity to receive consultation in matters concerning robotics. The aim, however, and this should be emphasized, is not to place as many robots as possible in the KMU's; this would be a misinterpretation of the state's obligations and would also be questionable in terms of economic policy. Rather, suitable solutions to company problems must be found, and at the same time ideas must be provided as to how and with what partners companies might be able to realize these solutions on their own.

\* The editorial staff has accepted this suggestion. In the next issue of ROBOTER we will have a comprehensive report on the main points of government support. Those who would like more information immediately should write to the Bundesanzeiger Verlagsgesellschaft, Heinemannstrasse, 53 Bonn-Bad Godesberg, where copies of the federal register are available for a small fee.

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## MICROELECTRONICS

### FINLAND'S NOKIA BUYS U.S. FIRM'S EUROPEAN SUBSIDIARIES

Helsinki HELSINGIN SANOMAT in Finnish 20 Jun 85 p 26

[Article by Heikki Arola: "It's Video Disc Time at the Lohja Company"; passages in slantlines printed in italics]

[Text] Absolute absence of dust is the most important video disc production factor.

The Lohja Company intends to succeed in the production of its flat display terminal where Valco failed: in bringing into the country a new industrial product of the high tech age, one which demands of its manufacturer extreme accuracy, precision and a production plant from which even dust particles have been eliminated.

In the final analysis other reasons were decisive in the collapse of Valco, but this was one of them: The rapidly assembled personnel did not conform to the extremely clean conditions that must be borne in mind in the semiconductor industry. The percentage of production rejects remained too high for too long.

A modern, high tech plant is more reminiscent of a school for midwives or an operating room than a factory. The workers wear full-length white smocks, face masks and rubber gloves on their hands. The difference from the operating room is that in a new tech plant they do not worry about bacteria's spreading. Powder and dust motes, particles that may be only a thousandth of a millimeter in size, give rise to dread. Just one mote in the wrong place can render the product useless.

Since Valco there has not been a high tech industry comparable to the semiconductors in Finland, but now there is, now that Lohja has begun production of its electroluminescent video disc.

#### New Culture

The chief developer of the video disc, Dr Tuomo Suntola, spoke of the new industrial culture. In his opinion, moving from a cellulose plant to a semiconductor plant is as big a jump as moving from the field to a cellulose plant was before.



A building has been erected in Olari newr Espoo in which they are beginning production and will reach full capacity within 2 years, at which time the plant should be turning out 10,000 video discs a month.

With its pillars and extension wings, the building in Olari is peculiar-looking, but the odd appearance is not due to any attempt to make it look peculiar or at architectural flamboyance. There is a clearcut objective in its form, which is determined by the production process.

The plan emanated in its purest form from the center of the building, where the so-called clean area is located. There a thin layer of film is produced on a sheet of glass by means of Lojha's own process and with its own equipment. The end result of the process is a flat video disc which Lojha sells as components to the world's big computer and instrument manufacturers.

A section was built into the lower part of the clean area from which materials used in the process, like gases, are conveyed to the upper floor through the floor. In the upper part of the clean area there are extremely powerful air conditioners which replace production plant air through filters about 20 times an hour.

They built up offices and accommodations for workers around the clean area and in this way Finland's first plant originally designed as a high tech plant was completed.

#### Out with the Particles

In display terminal production, as in the semiconductor industry in general, the first key word is /particles/, which means dust or powder motes.

From 1 to 10 million particles per cubic foot float about in the ordinary air circulating in a room.

In a semiconductor plant they try to get rid of them entirely at the most important production points, where they do not fully succeed in doing so even with the best equipment. Particles are still found, but their number is reduced to from 10,000 to 1,000 per cubic foot.

Lojha's most difficult production problem is posed by the /hard particles/, glass or metal dust which the workers call stone or gravel. There is no need to be concerned about the soft particles that are detached from clothing and people's skin, for example, in all stages of production because they disappear through burning in the course of the process.

#### Up with the Yield

The second key work in video disc production is /yield/. It simply means the degree of success, how many units that have gone through the process that are fit for use.

The rate of yield is essential in all industrial production operations, but in the semiconductor industry it is of greater importance than, for example, in the manufacture of milk bottles.

In semiconductor production the yield may be very small; for example, the yield percentage at microchip plants may fluctuate between 20 and 70 percent.

In general the rate of yield is one of a semiconductor firm's most carefully kept secrets. The yield can be raised by spending money on refining the production process, but that does not pay endlessly either, so a compromise figure must be sought somewhere.

Suntola did not say either what the Lohja Company's video disc production yield is at the present time. It is, however, considered to be sufficiently high since it would not otherwise pay to go into production.

Suntola did, nevertheless, have the courage to say something: "Our rate of yield is even surprisingly good. Better than we could have expected."

Increasing the yield can be influenced in many ways. According to Suntola, it is even influenced at the general level of the plant through attitudes. This is why more than usual was invested in the Olari building. The same phenomenon has been observed in conventional machine shops too: The cleaner the surroundings, the better the effect on the work.

#### Slight Advantage

The third key word in Lohja's video disc production is /packing property/. Suntola claimed that this is a property by means of which Lohja's product will gain a slight, but decisive advantage over its competitors when during the next few years they really begin to divide up the video disc market.

Packability is the fact that the production process developed by the Lohja Company is not at all as sensitive to critical particles, that is, dust motes, as its competitors' processes are.

In other words, a few stray dust particles in the interstices between the thin films of Lohja's video discs do not ruin the whole product: The process has the ability to "pack" particles so that they are harmless. This property is a consequence of the atomic layer technique developed by Lohja.

According to Suntola, this packability improves the yield of the Lohja process and the better the yield, the lower the production costs and the bigger the profit derived from the product.

Lohja is therefore also prepared, if necessary, to engage in a price war and, according to Suntola, price is the factor that determines the consumer's choice in these products, not, for example, a slightly better picture quality than the competitor's product.

The price of Lojha's video disc is now five times as much as that of a picture tube. Suntola wagers that at the latest by the next decade the price level of the flat video disc will drop by at least twice as much as that of the tube. At that time the demand will grow at an explosive rate, then video discs will sell and Lojha intends to be one of the hardest sellers.

#### Price Down

What are Lojha's real chances of attaining a "sales volume of several hundred million" in a few years time with its video disc, as is in keeping with the company's objective?

"It's a question of price and everything depends on the success of the mass production process. If they begin to produce a good product, it's possible that the price will rapidly sink since the raw materials don't cost much," a semiconductor expert said.

"We have our foot in the door now," Tuomo Suntola said, "but that doesn't mean that the challenges will become fewer in the future."

Competitors have to be watched closely, but because of his very own production process Suntola does not much fear that Lojha's end product might be copied. Other video disc techniques and entirely new production technologies by means of which production costs could be sharply cut or the product substantially improved pose a greater danger.

At any rate, Suntola expects there to be more flat video disc manufacturers within the next 5 years. Many big firms are displaying interest in it.

The competition is also forcing Lojha to continue with its product development. Suntola intimated that the electroluminescent video disc will not be the only application of the thin film process developed by the company. In principle it could also be used in the production of exacting liquid crystal displays.

Suntola said that it did not, however, pay to talk about their own production of liquid crystal displays, although the company has an empty site for additional construction opposite the Olari plant. A more likely alternative would be to collaborate with, for example, Japanese manufacturers by selling them the thin film technique, but so far the matter has not even been discussed.

#### Advantages of Electronics

Having spent 20 years in concentrated research on electroluminescence, Suntola might easily be taken for a typical theorist. Without wanting to be identified with any camp, he could not fail to praise the advantages of the electronics industry for a remote country like Finland with a high level of education: "The price per kilogram of passenger cars and meat is roughly the same, somewhere between 50 and 100 markkas. The price per kilogram of semiconductor electronic products can be 100 times that or more. These are truly international products; shipping costs are of no significance."

## Superchips Are Coming

A plant for the manufacture of microcircuits is to go into operation in Finland next year. It is anticipated that the plant, which belongs to the Micronas Company, a joint venture of Nokia, Outokumpu and Aspo, will meet about a third of the country's microchip needs.

The world's largest semiconductor manufacturers in Japan, the United States and Europe are simultaneously competing in a race in which they are striving to produce /superchips/, chips containing greater information capacity than before. With them in turn they would be capable of manufacturing thinner, smaller and possibly cheaper electronic devices than are at present in use.

In the manufacture of superchips they are dealing with really small units of measurement. The goal is to go beyond the magical limit of the micron, a thousandth of a millimeter.

We get some idea of the size of a micron when we compare it with the thickness of a hair. A hair is about 100 microns thick.

The first microchips, in which conductors containing transistors only a micron thick are side by side, are expected to be marketed as early as next year. At that time they will have gotten a million transistors, four times more than in the best chips currently in use, to fit into one microchip.

And the next step is to get to a half-micron conductor, which would mean 4-million-transistor microchips. It is estimated that it will be in production by the end of the decade. They calculate that it will take until the middle of the next decade to develop a quarter-micron microchip, but they consider it to be fully possible. One chip would contain tens of millions of transistors.

### Lower Limit

For years engineers felt that the practical lower limit of semiconductor to be built for a silicon disc was a micron, but the more experience they have had, the lower the limit has shifted.

The shifting of the semiconductor industry to ever smaller dimensions means that plants will gradually have to be wholly automated. Just a person's presence alone may interfere with the production process at the plant where they must attain completely dust-free conditions.

Thus they are switching to plants in which microchips handle the production of microchips.

It is estimated that some 30 of the biggest semiconductor manufacturers in Japan, the United States and Europe are in the superchip race. The Japanese are generally considered to have a tiny lead with Hitachi, Fujitsu and NEC in the lead. Those U.S. firms farthest in front are Texas Instruments, Motorola and IMB. The U.S. Department of Defense is a strong supporter since they could



not build star wars equipment without the superchips which create new dimensions.

The Europeans too are seriously participating. The continent's electronics giants, Siemens and Philips, have together launched the several billion markka "Megaproject," which the West German and Dutch governments are financially supporting. They have agreed to limit cooperation to research only. The firms will handle production independently, if they ever get that far.

#### In Crisis

The experts indeed regard the Siemens-Philips project as a hopeless attempt to at least somewhat continue to participate in a development that has managed to to a great extent slip out of European hands.

Semiconductor circuit production is at present in an international crisis. The industry is splitting into two parts. Only about 10 of the largest of the world's approximately 200 semiconductor manufacturers are capable of building giant plants in which the production of standard chips can be profitable. The others will have to specialize in small volumes and special products.

Ordinary mass-produced chips have become a commodity for speculation and shortages and overproduction of the product fluctuate alternately in the market.

It does not pay for Micronas either, which in international terms will become a very small producer, to start producing standard chips; rather it is concentrating on chips tailored to a specific purpose for the customer. Finnish manufacturers of electronic products will still procure standard chips from abroad.

Even after the Micronas chip plant is built, one important phase in the production of integrated circuits, encapsulation, will continue to be handled in the Far East. Micronas will only have a small experimental encapsulation line with which it will encapsulate perhaps 100,000 chips a year, whereas its total production amounts to tens of millions of units.

In Sweden the organization of its own encapsulation is regarded as a national issue for military reasons. Ericsson's subsidiary, RIFA [expansion unknown], is getting a subsidy from the government to build its new plant. When it is completed, it will be capable of encapsulating a million chips a year, which is really only 3 percent of Ericsson's needs alone.

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SCIENTIFIC AND INDUSTRIAL POLICY

SIEMENS CHAIRMAN THINKS EUROPEANS UNDULY PESSIMISTIC

Vienna INDUSTRIE in German 19 Jun 85 pp 12-14

[Interview with honorary Dr of Engineering Bernhard Plettner, chairman of the board of Siemens AG, by diplomate merchant Milan Fruehbauer and Christian Lenhardt, master; date and place not specified]

[Text] In the view of honorary Dr of Engineering Bernhard Plettner, chairman of the board of Siemens AG, there can be no talk of a technological uncoupling of European industry. On the contrary, the industry of the old continent is quite able to play along in the concert of national economies. The conversation with him was conducted by diplomate merchant Milan Fruehbauer and Christian Lenhardt, master.

[Question] Throughout Europe, the media are using the keyword Eurosclerosis, meaning that the technological level of the Japanese or the United States cannot be overtaken. In this connection, what expectations do you have for the event "Industry 2000" of the League of Austrian Industrialists, which is intended to give a new industrial vision to Austria at least?

[Answer] To begin with, I believe that the talk about Eurosclerosis is inaccurate and that there is a greater and greater awareness of this and therefore in reality less and less is being said about it.

But specifically in regard to the event organized by the League of Austrian Industrialists: I see myself as a guest here, to whom has fallen the task of acting as monitor of a working group entitled "International Aspects of Austrian Industry." The basic idea is that on this subject foreign speakers will present their answers to a number of questions concerning the relations of industry here to foreign countries and, in the subsequent conference, Austria's representatives will present their conclusions on what was said.

[Question] You were of the opinion that the lead of the Japanese and the United States is greatly overestimated. So is it just a European inferiority complex?

[Answer] I view it as one of the tasks of the fall symposium to show, particularly in public, that the pessimism being presented in our mass media with respect to the performance capability of European industry is false. Despite some advantage or other of the United States or Japan, the Europeans can play along in the world economic concert.

[Question] Do you agree with the idea that this pessimism is especially pronounced in the German-speaking countries?

[Answer] Yes, although I am not so sure to what I should attribute this. But in this connection, I would like to point out that Luther and Marx were Germans. That means quite simply that we have always been involved quite seriously and intensively in criticizing existing conditions.

[Question] In what area do you detect a lead of European industry?

[Answer] In economic matters, I do not believe that one can distribute gold, silver or bronze medals as in a sports contest. But when I take a look at the Austrian or German economy as a whole and see that about 35 to 40 percent of the gross national product in both countries is achieved through exports and that exporters are obviously not losing any money--at least I can say that for my own company--then the skepticism about top salaries, the necessity of importing all raw materials, and having the most holidays and the best social net becomes relative and there must be something to European industry and its efficiency. Or let us take another example: the Russians launch rockets into space, the Americans do likewise, and today the Europeans can, with the Ariane rocket built by the ESA [European Space Agency], offer an efficient and competitive as well as reliable product. And when one speaks of microchips, I would like to add that 70 percent of the silicon required for them is produced in accordance with a process that Siemens developed at the beginning of the 1950's. We still receive royalties from that--even from Japanese licensees.

[Question] There is currently murderous competition in the international market for microchips, whereby a market-share mentality seems to prevail, especially in the case of the Japanese. How is this possible economically?

[Answer] Here one must keep in mind one important circumstance. The leading American manufacturers of semiconductors are all companies that make only these products. With the Japanese, on the other hand, we see large conglomerates to which, as it were, such product lines have merely been attached. In view of a business volume encompassing many billions, activities in this area

can thus be subsidized by other sectors. Conversely, however, a semiconductor depression is having a direct impact on American firms. I would like to add something else here: the Americans were always the innovators in the area of semiconductors, whereas the Japanese merely copied.

[Question] On the basis of this situation, will there be a rapprochement between Americans and Europeans?

[Answer] Yes, certainly, because in this area Europeans now have more in common with the United States than ever before in warding off the Japanese. To be fair, however, one must say that both continents have in part promoted or at least contributed to the explosive development in the Far East by displacing product lines.

[Question] A question arises in this connection. Actively supported by public funding, the Japanese are about to invest in precisely this area in Austria. How does the Japanese involvement appear from Munich?

[Answer] Seen from Munich, we are naturally not very pleased about this project, especially since they are investing in a market that is already oversaturated. On the other hand, however, I am profoundly convinced that everyone is the architect of his own future.

[Question] In the middle term, could a continuation of this sort of involvement in industrial structural policy lead to a review of your involvement in Austria?

[Answer] No, we have been involved in Austria for more than 100 years. One does not withdraw from a country where one employs more than 15,000 people and where one is so satisfied with the company's work.

[Question] And with respect to the special area of semiconductors?

[Answer] Not here either. The construction of the next semiconductor plant in Regensburg is justified by the simple fact that the research sites and laboratories in Munich are an hour and a half away and one has naturally sought to be near them. Neither can one build everything in Austria, for the labor market in Villach is, after all, also limited.

[Question] How do you see the trends against technology and industry in the FRG?

[Answer] I already said that the worst is behind us but that we will have to deal with this for many years to come, even though at least so far it has not come to such foolishness as building a power plant and then not putting it into operation and even though

the importation of raw materials is the most important item in foreign-trade statistics.

[Question] Is this the only nonsense specific to Austria that you are registering in Munich?

[Answer] In principle, I am of the opinion that everyone should mind his own business, and if I made note of this in regard to Zwentendorf, it was only because nuclear energy is dear to my heart.

[Question] Could the bringing of the Greens into government responsibility in the Land Hesse have consequences for nuclear-energy policy in the FRG?

[Answer] I do not think so. The fact is that this government coalition has not yet come about and will not come about, in my opinion. It will continue to be a case of sufferance on the part of the SPD government. In addition, the behavior of the Greens in Hesse so far has been directed more toward getting money for their subgroups and smaller groups than toward implementing long-term goals.

[Question] Do you believe that for technical and industrial reasons the FRG should under all circumstances take part in the SDI program of the United States?

[Answer] I do not consider the question properly put, just as I am of the general opinion that this problem is not being properly handled in public. For it must be said that the U.S. Government will not be doing research but will award research and development contracts to industry. The same thing holds true for the FRG. That is, I am not of the opinion that it should be a decision of the government alone whether one participates in the SDI project.

[Question] But is the decision not eminently one of foreign policy?

[Answer] I agree only to the extent that with a positive decision one is supporting a very definite policy of the United States. If I look at the implementation side, then I do not agree, of course.

[Question] One is repeatedly presented the vision of total automation, that is, the deserted factory. This leads to a profound loss of confidence in broad groups of industrial employees. How do you see the discussion in the FRG--from the point of view of the high basic unemployment, for example?

[Answer] Two hundred years ago, 75 percent of the population had to work in agriculture to feed themselves and the rest of the population. Today 6 percent are enough to do this. To be sure,

the reduction of the population working in this sector was always presented as a nightmare, but today no one talks about the problem of migration from rural areas. Now its place has been taken by the fear of nationalization in industry.

But one is thereby overlooking the fact that one not only owes the prosperity in the industrial countries to this industrial activity but also that only technical progress has made it possible to feed, clothe and provide heat for the almost 5 billion people now living in this world. I am, of course, not overlooking the terrible famines in Africa. But that is not a problem of shortages or of the availability of foodstuffs but purely a question of distribution.

So even though it has been sanctified by history, it is my conviction that the fear of rationalization is completely false. For if I produce an object with less material or application of manpower, then I am doing a favor to the society and the national economy. The increased production, namely, is advantageous for all: for producers, who achieve better results and can invest more; for employees, who gain more freedom and better wages; and for the consumer, who finds cheaper and better products in the marketplace. That is, rationalization raises the standard of living and as a whole is advantageous for all. Finally, it is true internationally that even when jobs are eliminated in the micro-area, one is not therefore worse off overall in the macro-area.

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SCIENTIFIC AND INDUSTRIAL POLICY

PHILIPS EXPECTS LITTLE FROM SDI, PREFERS EUREKA CONCEPT

Rotterdam NRC HANDELSBLAD in Dutch 25 Jun 85 p 13

[Report by Wubbo Tempel and Ben van der Velden: "Philips Expects Little from SDI and Sees More Possibilities in Eureka]

[Text] Eindhoven, 25 June--Philips doesn't expect much of SDI, the American research program into space defense, for European industry. The Eureka plan for technological cooperation in Europe, on the other hand, could offer the European electronics industry more possibilities.

According to sources at Philips, deliberation is taking place among 12 large European industries about the manner in which Eureka might be realized. Philips is the most important Dutch industry which might participate in programs such as Eureka or SDI. Philips would like to see a program set up within Eureka for research and production in the area of telecommunication, in the spirit of the "RACE" program [Research and Development in Advanced Communications Technologies for Europe]. Moreover, it would want to propose a Eureka program for a radar system for the benefit of air traffic control in all of Europe.

One condition for a successful Eureka program would be that it would have to be of a sufficient size, that is to say with a budget of over 1 billion ECU [European Currency Units] (2.5 billion guilders) per year. Moreover Eureka must consist of original research and must become greater than the combination of research projects already under way.

At Philips the emphasis is primarily on the fact that the program must not consist of research only, but that it must also result in production. Philips has no need for programs exclusively in the form of ESPRIT [European Strategic Program for Research and Development in Information Technology]. ESPRIT is a large program with which the European Community stimulates research in information technology at European companies and universities. That takes a lot of time of high-level scientists. There is not an unlimited supply of such scientists in industry. Moreover, it is significant that the E.C. subsidizes similar research by only 50 percent, while those who carry out similar research projects for the American Department of Defense get 108 percent compensation for their costs, that is to say including a profit margin.

In order to make a Eureka program for the electronics industry a success, it is essential, according to Philips, to include in it a European standardization of electronic apparatus, the removal of European trade obstacles, and moreover the initiation of cooperation between important principals. In the case of telephone communication, for example, those are the national PTTs [Post, Telegraph and Telephone].

#### Rational

Philips sees far fewer possibilities in the American SDI program than in Eureka. At Philips they say they are not "skeptical" about SDI but merely "rational with respect to the possibilities."

According to Philips, at most \$1 billion of the \$26 billion budgeted for the SDI research will be spent in Europe. With this money the Americans will primarily want to buy knowledge they don't have themselves. Moreover, there is no connection between a research project and a potential order for production. Philips on the other hand wants to arrive at production via a research order. Philips considers the possibility very small that participation in SDI will lead to acquisition of knowledge from other parts of the program. The transfer of knowledge is not customary in such defense technologies.

Further it is still not clear to Philips what exactly the SDI program will consist of and how the company might potentially contribute. It is not customary in defense contracts to ask details about the technology, nor is it customary to offer them. As to Philips, in considering whether Dutch industry might be able to furnish a contribution, it still is a matter of "probing."

#### Subsidiaries

Thus, for the time being, Philips doesn't know whether it possesses any unique knowledge which the competing American companies don't have. The concern expects that Dutch industry will at most be able to participate in the SDI program as subcontractors. To this end discussions have been held with Fokker, TNO [Netherlands Central Organization for Applied Natural Scientific Research] and the National Aeronautic and Space Travel Laboratory, with whom a consortium could be set up. The term "subcontractor," which disturbed French President Mitterrand, does not sound unfavorable to Philips, which called it "realistic." SDI is an American program and thus the contracts first go to American industries.

For that matter, the American subsidiaries of Philips are independent of Eindhoven in the acquisition of orders from the American defense industry. Philips in Eindhoven has no access to the accompanying defense technology. According to Philips Eindhoven, the American subsidiary Magnavox, which maintains an entirely independent contact with the SDI bureau in Washington, has not yet received any orders for participation in the SDI program.

The fact that the British Heriot-Watt university in Edinburgh has received a research order from the SDI organization is not considered important by Philips for the position of the European industry. "We would never accept

such an order. In the university world something like that is different from in industry." The British researchers are getting \$150,000 for the work on optical computers, while they are furnishing millions in knowledge to the Americans. An industry is not interested in only being allowed to do research, but it also wants to produce something.

Also the fact that the SDI organization approached this British university group is not surprising to Philips. "Everyone knows from publications that they are the ones to contact for this type of work." For reasons relating to competition, industries usually prefer not to attract attention with publications.

#### Massage

At Philips, SDI is primarily seen as a strengthening of the American technological foundation. By participating in SDI a European industry does not gain access to that technological foundation. One advantage of SDI is the "massage effect" that the program has already had in Europe. "One is aware that something is happening in the United States," is being said at Philips. Through that, it will be realized that the European competitive position can be strengthened through cooperation in Eureka.

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SCIENTIFIC AND INDUSTRIAL POLICY

FRG BEGINS TO CRYSTALLIZE CONCEPT OF EUREKA

Frankfurt/Main FRANKFURTER ALLGEMEINE ZEITUNG in German 26 Jun 85  
pp 1,2

[Article: "Bonn Wants to Endorse a Civilian EUREKA Program:  
Before the Milan Summit/Cabinet Bases/Riesenhuber Warns Against  
Haste"]

[Text] Bonn, 25 Jun--The Federal Government is expecting a fundamental decision from the European summit in Milan that should be the political impetus for increased technical and scientific cooperation in Europe under the "EUREKA" sign established by the French Government. On the strength of the bases for participation in EUREKA by the Federal Government as determined by the Europa and Technology Cabinet, Bonn will come out in Milan primarily in favor of joint civilian research and development projects (with no direct relationship to space plans) that, as Research Minister Riesenhuber said on Tuesday, cannot be accomplished nationally and that could be better realized by crossing national boundaries. To prepare for the summit, however, questions of security policy will also be discussed by the foreign and defense ministers of France and the FRG this Wednesday at Venusberg in Bonn. Among these questions is the reconnaissance satellite that has been discussed since the German-French consultations at Bad Kreuznach. The research ministers are involved in this German-French round in preparation for Milan.

In a statement on EUREKA, Riesenhuber has explained the objectives of the program, saying that the innovative forces in Europe must be more strongly developed through the heightened cooperation of scientists, research facilities and industrial enterprises. EUREKA is to provide an impetus in civilian technology with the effect that the Europeans can permanently hold their own against Japan and the United States. As typical examples of such cooperation, Riesenhuber envisions the joint development of even faster computers or of technologies to clean up contaminated garbage dumps.

The research minister is not, however, picking up the words "Europe of technology" coined by Foreign Minister Genscher. It

is not a Europe of technology that is desirable, says Riesenhuber, but the proper application of technology that truly serves people. One should not, for example, be too hasty in setting the goal of building a European supercomputer. Prior to such decisions, one needs to weigh soberly what specifically should and can be done with such a computer. Riesenhuber warns against drafting hasty projects. In each specific case, one should check whether a certain technical product promoted with public funds benefits the Europeans and whether industry cannot provide it better alone. The promotion of research within the EUREKA program should not be inconsistent with the research policy of the Federal Government. There are as yet no project proposals ready for decision. There is an expectation in Bonn that the European Council will direct the research ministers to make some suitable proposals.

From Bonn's point of view, the EUREKA projects should be closely linked with research promotion through the EEC Commission. According to the Ministry of Research, EUREKA cannot contradict the research policy of the EEC Commission. But loosed from the traditional institutional mechanisms, European cooperation within the EUREKA program must proceed more purposefully and effectively. On Monday afternoon, Commission president Delors informed Federal Chancellor Kohl about the proposals in Brussels for the future joint research policy. Beyond the EUREKA initiative, the EEC Commission wants to promote specific training practices and advanced technologies, whereby it is calling for an increase in the joint research funds from 3 to 6 to 8 percent of the EEC budget by 1989. In a report drawn up by the Ministry of Research, it is made clear that EUREKA is not directed against a participation in the SDI research program.

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## SCIENTIFIC AND INDUSTRIAL POLICY

### NORDIC PAPERS ASSESS PARIS EUREKA PROJECT PARLEY

PM241011 [Editorial Report] Nordic newspapers of 19 July carry editorial comment on the 17 July Paris Eureka meeting. Their reaction is cautiously positive, although all point to the lack of any concrete results produced by the meeting. Oslo's AFTENPOSTEN in its page 2 editorial writes: "When on Wednesday evening leading politicians from the West European nations ended their discussions in Paris there was still a long way to go before the plans can be turned into reality. But the main objective was achieved, in the sense that Eureka cooperation can now be considered to have been set up. In addition the discussion surrounding Eureka has already turned a new and powerful spotlight on the weak points in Western Europe's technological efforts."

A second aspect of the project that is welcomed is the fact that it is not confined to the EEC nations. In this connection AFTENPOSTEN reiterates Norway's much-voiced concern about its peripheral position outside the EEC: "Norway and the other nations outside the EEC have been invited into the Eureka project on an equal footing with EEC members. This represents a valuable opportunity for our country, in that it prevents us from falling further outside the European mainstream in an important field. We have learned many lessons from an existence on the sidelines and there is little reason to allow them to acquire any further depth."

Copenhagen's BERLINGSKE TIDENDE in its page 8 editorial hopes that this broad base for the project will help to overcome a certain narrowness of vision on the part of some of the EEC's members: "It is a promising sign that from the very start Eureka is looking beyond the limited horizon and is admitting countries which want to take part. The broader the European base encompassing industrial and scientific expertise, the greater the potential investment. The European need to measure up to Japan and the United States is not confined to the countries with the EEC's tariff union and it would have been short-sighted to keep other nations outside the cooperation project. But it is not surprising that it can seem unusually sudden to the old EEC nations to have to think in broader terms when they had thought that Eureka had been launched as a community project. The fact that it was not the EEC pulling five other countries along created difficulties in Paris. But the political inhibitions toward broader, equal-footing cooperation are not shared by industry and science and as this cooperation begins to make progress it could well overcome this narrowness of vision."

Stockholm's SVENSKA DAGBLADET in its page 2 editorial points to some of the problems besetting the project: "The areas of cooperation pointed out by

President Mitterrand are as follows: large-scale computers and artificial intelligence, laser technology, telecommunications and biotechnology. It should be said that West European research is already holding its own in international terms in several of these fields. But when it comes to turning research into commercially viable products Western Europe undoubtedly lags pitifully behind the United States, for example.

"Perhaps the most important reason for this is the fact that the West European market is so fragmented. Trade within the EEC and the free trade in Europe connected to the EEC is still hampered by obstacles of a non-tariff nature which also make joint ventures between Western Europe's high technology companies more difficult.

"Let us hope that Eureka will take off. This would mean much for West European industry, including Swedish industry. However, it is of the utmost importance that those who are responsible politically should realize that down-to-earth things like simplified border procedures are just as important as magnificent projects."

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## SCIENTIFIC AND INDUSTRIAL POLICY

### FRG GOVERNMENT FORMS CABINET-LEVEL HIGH-TECH COMMITTEE

Duesseldorf VDI NACHRICHTEN in German 5 Apr 85 p 1

[Article: "Politics. Importance of New Technologies Prevails: Cabinet-Level Committee for Technology Policy Established by Cabinet"]

[Text] With its decision to drastically reduce the number of cabinet-level committees from 13 to 6, but at the same time forming a new one on future technologies, the FRG government has made clear the importance that is afforded technological policy and the economic, social and political questions associated with it. Only by going beyond departmental constraints and employing a systematic approach can these problems be solved. In cabinet-level committees the chairmanship is traditionally held by the chancellor. However, Dr Heinz Riesenhuber, the minister of research and technology, is heading the technology committee. Other members include the foreign minister and the ministers of finance, economics, defense, transportation, the postal service, education and science, as well as--though he was not included in the original plan of chancellery minister Schaeuble--the minister of labor.

The coalition parties welcomed the formation of this committee in a very positive manner, but the SPD and the DGB tied their approval to their demand, which was then met, that the minister of labor also be included. Wolfgang Roth and Josef Vosen, both SPD deputies, emphasized that the burning questions of future social development which arise as a result of technical advancement must more than ever be considered matters to be dealt with by all social and political forces.

Siegfried Bleicher, a member of the board of the DGB, demanded that the minister of labor be granted "considerable influence." Also to be avoided, according to Bleicher, was a consensus within the committee regarding research policies which were one-sidedly in favor of military research projects. In addition to this cabinet-level committee the DGB also wants a concrete dialogue concerning plans for research and technology policy to take place between the unions, employer associations and the federal government. This could be a "milestone of technological development which is both feasible in terms of social policy and supportable in terms of economic policy," he said. Bleicher praises the minister of research and technology for having recognized

the signs of the times and hopes that he is able to prevail in the cabinet. There had been considerable political reservations within the government about a cabinet-level technology committee, he went on; its purpose should not be to determine the points of emphasis regarding the development of new technologies.

The other five cabinet-level committees are concerned with foreign policy and national security, European policies, policies on Germany and Berlin, economic policy, and health and environmental policies.

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SCIENTIFIC AND INDUSTRIAL POLICY

FRG OFFICIAL ON NATIONAL AEROSPACE PROGRAM

Bonn WEHRTECHNIK in German Jun 85 pp 16-25

[Interview with Martin Gruener, state secretary at the Federal Ministry for Economics: "Aviation and Aerospace are High-Technology Fields. WEHRTECHNIK Interview With State Secretary Martin Gruener, Government Coordinator for Aviation and Aerospace"; date and place not specified]

[Text] In the following interview with Martin Gruener, the state secretary at the Federal Ministry for Economics, questions of state support, civil and military R&D programs involving aviation and aerospace, utilization of industry and departmental agreement within the FRG government were discussed.

[Question] What is the task of the coordinator? Does he coordinate industry or the departments within the ministries?

[Answer] Because we have no authority over industry I do not coordinate industry but rather the departments of the FRG government.

[Question] A few years ago a government aviation and aerospace program was made public. Has this program been continued and is it still in effect?

[Answer] To date, aviation and aerospace industry reports, last published in 1982, are the basis of the aviation and aerospace program. In essence they contain the FRG government's global objectives and overall conditions. Depending on the situation, such reports are to be released at regular intervals but involve no specific time frame. Possible publication is currently under consideration. Additional cabinet decisions on individual programs and projects are added to update the reports.

[Question] Is this 1982 report still valid today?

[Answer] Yes, basically it is still valid today, although some new aspects have been added in the meantime; that is why newly published releases are always necessary--basically they reflect the events which have happened in the meantime and the tangible developments regarding the stated intentions of the



FRG government at the time of publication. It also serves as a kind of balance sheet by which not only the cabinet but also the public can themselves render the accounts. In 1982 the questions of a space station called Columbus or possible participation in the Hermes project had of course not yet arisen. Nevertheless, we have voted in favor Columbus and continued development of the Ariane. We needed no report to accomplish this. The cabinet decided, and its decision will be published in a report.

[Question] Is the question of participation in the Hermes project still open?

[Answer] Yes, it is still open. We have declared our willingness to participate in the development of an engine for Ariane and that is the preliminary stage in deliberations by the French to proceed with manned space flight. The French are in the initial phase of study on Hermes. At the conference in Rome we were as yet unable to commit ourselves to participating in these studies.

[Question] Will the next published report wait for the decision on the Strategic Defence [as published] Initiative (SDI)?

[Answer] We cannot make the publishing of a program dependent on such decisions. It is not possible to tell how long the decision-making process will take on the SDI. However, the current status of these questions and the intentions of the FRG government will be addressed in the published report. Naturally, intentions can be overtaken by actual events. Such reports are also important, however, because they force the departments to express themselves. It is then the task of the coordinator to compile these views into a comprehensive whole which will enable the cabinet to recognize and determine the financial consequences of the overall representation.

[Question] What requirements regarding civilian and military aviation, as well as the aerospace field, are contained in the FRG government's aviation and aerospace program?

[Answer] The aims of the FRG government's civilian and military aviation research are summarized in the aviation research program. The current program, 1985 to 1988, is being worked on right now.

Following the successful completion of the A-300 and A-310 wide-bodied civilian aircraft, the Airbus industry is now developing the smaller A-320. Another addition to the Airbus family currently under study is a possible long-range model, the TA-11.

In the field of small multipurpose aircraft, Dornier, with the Do-228, has found a promising segment of the market. This sector of the industry is currently planning improvements and further developments which in the long term extend to a pressurized aircraft. In the area of civilian helicopters, development is currently under way on a successor to the Bo-105.

In the field of military aviation, the main programs involve the anti-tank helicopter 2 and the fighter aircraft, the JF-90. The government therefore hopes that a quick decision for a five-way project will be made on the JF-90.

Efforts within the armaments industry toward a fair measure of participation are being supported.

In the field of jet engines, German industry, in addition to the existing civilian and military programs, is participating in the international consortium which is developing the V2500 engine for the A-320 Airbus. An additional military engine is in the planning stages in conjunction with the development of the JF-90.

The FRG's fourth currently existing space program was enhanced by a cabinet decision on 16 January 1985 in which the FRG voted in favor of 38 percent participation in European development efforts involving components for the American space station under the name "Columbus," as well as in the development of a cryogenic engine, the HM60, for the Ariane V rocket. At the meeting of the ESA council of ministers, the various national concepts regarding the ESA program for the coming year were summarized and adopted. In addition to the large-scale projects, Columbus and HM60/Ariane V, a substantial increase was adopted for the scientific program.

[Question] How are civilian aircraft construction and aerospace supported by your ministry and by the BMFT (Federal Ministry for Research and Technology)?

[Answer] The BMFT is primarily responsible for supporting civilian aviation research and aerospace. Support for civilian aviation, within the scope of the economics ministry, includes development and production projects for civilian aircraft, engines and helicopters. Under certain conditions our ministry makes repayable grants which may cover up to 60 percent of the development costs for aircraft or engines. In large-scale international projects in which industry cannot supply enough of the necessary funds, this amount can be exceeded.

[Question] Is there an established limit?

[Answer] No, the limit is decided on a case by case basis. Repayment of the grant is generally based on sales.

The FRG government guarantees grants to the Airbus program for financing sales in order to prevent Airbus from being placed at a disadvantage in terms of its American competition which receives state subsidies through the Exim Bank for example. The FRG, however, is striving for an agreement at the international level which will make it unnecessary to provide grants in order to promote sales of civilian aircraft.

[Question] So that is how the Federal Economics Ministry supports the civilian aircraft industry. How does the BMFT support civilian aviation research?

[Answer] In addition to a share in the basic financing of the DFVLR (German Research and Testing Institute for Aviation and Aerospace), technological projects are being supported as a prelude to future projects within the scope of the aviation research program of the BMFT. Also being supported are important investment projects such as the planned European transonic wind

tunnel and a low-pressure chamber for engine testing. About DM 170 million will be spent in 1985.

[Question] The BMFT also supports aerospace. What is the scope of this support?

[Answer] The decisions already mentioned concerning the Columbus and HM60/Ariane 5 projects underscore the government's intention to promote developments in aerospace in the future as an important high-technology area. However, the government will also see to it that industry for its part endeavors to provide competitive products worldwide based on the expertise gained as a result of development awards provided by the public sector. In 1985 about DM 800 million will be spent by the BMFT on aerospace including about DM 400 million in FRG contributions to the ESA. Taking into account the expenses for Columbus and HM60/Ariane 5, a medium-term accumulated fund of approximately DM 1.2 billion will be needed.

[Question] Who actually decides whether a project merits support? Does employment policy play a role in such decisions?

[Answer] We decide and our decision is based on the economic outlook. Industry presents its case and we make the selections. In the case of civilian projects there was first and foremost a decision which was based on several considerations--first, the realization that, despite the vitality of the British and French aviation and aerospace industries even at the time, a civilian aviation industry concentrated in a single nation in Europe could not compete with America. The second consideration was to have more of a balance between defense-related and civilian programs while fully utilizing industrial capacity. And finally the third consideration was the aim of implementing such a civilian project involving European cooperation. It was clear from the very beginning that civilian cooperation without state aid was not possible. Thus, the cause of support for civilian aviation was advanced. There are a number of programs--the Do-228, the Bo-105, the VFW 614, the HFB 320 and participation in the Dutch F-27 and F-28. Unfortunately, some of them have been unsuccessful. As a rule, there were always intense prior discussions with industry followed by a cabinet decision. But even when a discontinuation was necessary, we were consulted.

I must say, however, that a large-scale program such as Airbus also affects other programs. There are many interesting suggestions that we can therefore not follow up on. This places smaller projects at an unfair disadvantage, but we are simply all booked up. The development of the Airbus has taken up a large share of our capacity because in the beginning it was not possible to foresee the necessity of producing a whole range of aircraft.

[Question] What is receiving support at the moment in the civilian sector besides Airbus? The Dornier 228 and what else?

[Answer] We are working with Fokker on the F-100. Also contributing on the German side is the Land of Lower Saxony. And we are also assisting MTU

[expansion unknown] with regard to engines like the 2037, for example, and helicopters.

[Question] To what extent is the equipment industry involved in the programs mentioned?

[Answer] To the extent that they get contracts from systems management. We have a procedure whereby with the Airbus, for example, MBB (Messerschmidt-Boelkow-Blohm) makes a decision as to what equipment it needs for its share of the construction effort. Equipment suppliers must then submit bids. With the Airbus it is of course also possible for German equipment suppliers to be involved in the French or English share of the construction effort. Politically we have a very high level of interest in involving as many equipment suppliers as possible, and thus, within the scope of the development funds made available by the federal economics ministry, we have also made "corresponding" but not legally binding impositions on MBB with the result that MBB has made an effort to involve German equipment suppliers. We have made our view clear with regard to the Airbus industry and have always paid careful attention to the fact that information on any disadvantages experienced by German equipment suppliers was also discussed at the political level in order not to run the risk that decisions would be made elsewhere with less objectivity.

[Question] With the A-320 program you have strongly urged that the German equipment industry receive a fair and reasonable 30 percent share. What is the current status?

[Answer] As yet we can make no final assessment because some decisions have not yet been made. But we expect to receive 30 percent. This figure refers to a share of the mass production. If you look at the development costs, it would probably be 25 percent. Compared to the situation earlier, this is already a huge success and exceeded even our somewhat sceptical expectations. However, it can also be attributed to the increasing level of performance in our equipment firms.

It is important that the other partners know the value which the FRG government places on the fact that our equipment industry is represented in keeping with our level of financial support. But that is just one argument among many. There have also been great efforts on the part of German equipment suppliers to become involved in labor packages which have been awarded by France and Britain. With England, of course, we have an even balance. Within the equipment industry the German share in Airbus activities has increased continuously and rapidly. Between the A-300 and the A-310 it increased from almost zero to 17 percent and now with the A-320 from 17 to 25 percent--based on development costs, as we said before.

[Question] What do you see in terms of future developments regarding the Airbus?

[Answer] We regard it as indispensable to expand the Airbus product range, and therefore we have taken this step to the A-320. We still think it proper that this expansion take place and that the partners in the Airbus industry



agree to such an expansion. This presupposes in turn that they are able to adequately estimate the market chances for their firms regarding such a development and that they are in complete control of their overall package of financial obligations and technical capacity.

[Question] What is the outlook for the long-range version of the TA-11? Do you support this project?

[Answer] In principle we have nothing against it provided that industry submits such a proposal, that it agrees on it and that it provides reliable sales predictions which make it clear that the program is economically feasible. In our view this includes orders by airlines. Up to now all this does not yet exist. With the A-320 we have also made it a condition that a certain number of orders and options must be present before the go-ahead is given.

[Question] How do you coordinate things with your foreign colleagues with regard to cooperative projects?

[Answer] In Europe the aviation industry is one of those areas in which national autonomy is no longer an alternative. Therefore, cooperation is always necessary when the state is involved. In the field of military technology there is, in international programs, always very close cooperation among the state's contracting agencies (buyers) who order and who pay and who get what has been ordered. Thus it is not a question of sales as in the civilian sector. There we have just as much close contact at the government level. Of course, there are different support systems for these programs in the individual nations which are not always clearly understood. They have developed differently, but in any case the cooperation is very intensive. Like our English and French colleagues, the biggest problem we have is evaluating the market for the A-320. It is worth mentioning with regard to the Airbus industry that it began in 1969 as a bilateral project between France and Germany and has developed in the meantime into a multilateral joint project in which all of the EC nations with an existing aviation and aerospace industry, with the exception of Italy, are participating.

[Question] What ranking does field of aviation and aerospace have in terms of support for technology or better yet support for high technology?

[Answer] From a technological point of view aviation and aerospace have a very high priority. Naturally, you have to differentiate between the development and production of a civilian or a military aircraft. With the former I would not rank the importance of its technology quite so high, although there are certain developments in the civilian aircraft sector which do not apply to military projects and which thus have their own value. The aerospace field, on the other hand, constantly demands designs which go far beyond what has existed in the past. Other constraints include satellites which must operate automatically in space for many years, as well as factors like the absence of gravity and the presence of cosmic radiation.

Applications of new technologies derived from developments in aviation and aerospace are not so clearcut. They serve primarily to further develop products specific to that branch of industry. Transferring that technology to other sectors can be relatively difficult and usually involves only a few examples which are, however, characterized by diversity. I can give you a few examples:

- Aerodynamic improvements for express trains, motor vehicles, wind energy systems, hulls of ships, etc.
- The use of light construction materials (carbon fiber reinforced materials for ultralight structures in the automotive field, rail vehicle construction, solar facilities, etc.)
- Rocket engine systems used with oil burners
- Improved materials in specialized machine construction
- Highly reliable videotext systems for monitoring complex control systems, e.g. power plants, etc.
- Transfer of physical aviation-related phenomena to other areas such as medicine, for example--remember the kidney stone shattering procedure.

In the aerospace field it is easier for us to give significant examples of how other sectors of industry have been influenced. Modern communications systems based on the use of satellites have much to do with further developments in other industrial areas. At the same time the aerospace field is also closely bound to the field of microelectronics because modern satellites require the development of light-weight, highly integrated circuits such as do not exist in other areas of industry. This in turn led to many developments in robotics.

In relation to the continuing Spacelab experiments, the growth of crystals, the manufacture of new alloys and new production methods ought to be mentioned. The construction of the space station at the same time provides new ideas for more complex kinds of systems management and for the use of new intelligent machines.

[Question] Cooperation between the ministries for economics, research and technology, and defense has been criticized in the past with regard to support for research and development in the military sector. Is there greater cooperation now than there was a few years ago?

[Answer] I am not aware of such criticism. But I would not deny that it can occur, because naturally the policy of the defense ministry regarding support for various programs is dominated by military requirements. Thus there are also differences of opinion among the different consumers, but in such cases the economics minister has little to say. In this discussion we can only bring up the question, "What is the technological significance?" The military has an entirely different point of view. They are interested in whether the technology can be used in terms of military security. Many of these developments cannot even be used by us and neither can the BMFT apply them. In the research sector there is cooperation between us, the BMFT and the defense ministry.

In any case, one mark that we spend for R&D is more valuable than one spent for hardware because we have an overall return which is six-fold. Therefore, we support the minister of defense whenever he promotes new technical efforts. Every mark spent in this area is a mark well spent for economic as well as technical reasons, while military hardware, as necessary as it is for security reasons, provides no national economic benefit. But it is necessary in order to avoid a "worst case" situation.

[Question] How is this cooperation among the departments regarding support for R&D organized?

[Answer] For interdepartmental cooperation there are institutionalized groups from the labor level up to the LRI [expansion unknown] committee of the state secretary. Thus, in the research area, for example, i.e. for the preliminary stages of support by the defense ministry and the civilian research efforts of the BMFT, there is close cooperation with the economics ministry with a view to later support for the development of civilian aircraft projects.

[Question] Is there an overall concept for departmental cooperation?

[Answer] That is part of my function. But it existed even before. But there always are and always will be conflicts of interest due to the nature of things. For example, we do not judge the military aspect and cannot judge it. We simply bring up other concerns from our own point of view.

[Question] The military projects (JF-90, PAH-2) are supposed to become large-scale international programs. To what extent can you exercise influence over the other ministers? This also brings up economic questions: do you pursue development on your own, manufacture under license or in combination with others, or do you purchase what you need?

[Answer] Regarding the JF-90 there was a personal conversation with the defense minister, i.e. direct bilateral contact, and this has also been standard with other large-scale projects. But whether this influenced the decision of the defense minister regarding these multi-lateral problems is difficult to say.

[Question] Construction of a group of civilian aircraft based on the PAH-2 is also being talked about. Surely your ministry will be requested to provide support?

[Answer] This idea of civilian use of the aircraft was brought up by industry. At the time of the PAH-1 the situation was just the reverse. With the PAH-2 the market trend is not yet clear. But the use of components for a transport helicopter would fit into the picture.

[Question] When the defense minister requests development aid from the finance minister--for the PAH-2 it will be about one billion marks--can he count on your support?

[Answer] The coordinator exercises no power. He has no pot from which he can distribute money. But assuring oneself the support of the economics minister within the cabinet is always a negotiating factor. This is also true for the civilian sector. That is why the research minister also sought the support of the economics minister regarding Columbus.

[Question] There must be a similar situation then with the SDI?

[Answer] The departments within the defense ministry, the foreign ministry and the ministry for research and technology have been dealing with this problem for some time, and later they will appeal to the economics minister and the finance minister. This is normal. First a project is worked out within a department and then they seek support from other areas.

[Question] Then there is no direct, measureable support for military programs by your ministry even in the preparation stage?

[Answer] Only in terms of the voice which the economics minister has within the cabinet and additionally regarding the weight he carries due to his function as coordinator.

[Question] What is the outlook regarding financing the JF-90?

[Answer] The joint study for determining a final draft, which was ordered by the defense ministers of the five nations in the fall of 1984, has produced no clear results up to now. Due to the various interests represented by the participating nations they have come to no agreement which would allow joint development efforts to get underway. However, Defense Minister Woerner has stated that a decision must come in the summer of this year. To date, the development costs are covered by a partial program within the interim budget totaling DM 1.1 billion, but its release is subject to certain conditions. DM 120 million have now been released for 1985 for carrying out the preliminary program. Here, too, there is close cooperation between the departments involved.

[Question] What is your view of the capacity of the German aviation and aerospace industry in the three areas of R&D, manufacture and maintenance?

[Answer] The aviation and aerospace industry of the FRG currently employs about 70,000 people. First of all, capacity will vary among the three areas. We are naturally concerned about how to fill the gap created by the completion of the Tornado project, and this is also true for civilian projects like Airbus. This development must be viewed with concern. In the area of development, on the other hand, we will be pretty well off if PAH-2 goes as planned and the JF-90, the space projects, the drones and the missiles go through. However, we must also admit that in contrast to earlier years we have wound down considerably in the development area.

Delays due to increases in the amount of electronics must also be kept in mind. Maintenance is the third area, and here the quality of the products reflects back on industry in the form of increased reliability and the need



for less maintenance. In addition, the air force today has its own maintenance facilities, and we will see to it that if there is a reduction, it will occur evenly at both air force and civilian maintenance facilities.

[Question] The equipment suppliers are also affected when cell companies encroach more and more into the equipment sector, and this also happens at the expense of small and medium-sized firms. Do you keep out of these matters entirely?

[Answer] We keep an eye on these activities. In the civilian sector the customers, e.g. the airlines, see to it that the cell companies do not become too strong in the equipment supply sector.

[Question] How is the newly prepared COCOM list for German industry working out?

[Answer] The agreement on continuing the COCOM list was really not so controversial. All that has changed is the determination of the Americans themselves, based for the most part on already existing COCOM obligations. COCOM basically deals with transfers of technology from West to East, and we have specifically requested that the German business community inform us when they feel that their exports are being hindered so that we can inform the Americans through our continuously open channels. But we have not been told how to tell if we are dealing with intentional obstacles to the transfer of technology. More often delays due to more stringent requirements are what stand in the way. In other words, there is no blockade but there are administrative obstacles. That is aggravating enough as it is. But the Americans are endeavoring to remove such existing obstacles. Reports concerning the technological gap in Germany have naturally hurt us a great deal. Such things are said without a second thought and are easily picked up by the media. We have fought a hard battle here and have to tell the other parties involved that they are talking the Germans right out of the market. How can you sell something elsewhere in the world when the administration or institutions like the EC announce without contradiction that European industry and particularly German industry are behind. In the case of the EC, for example, their data on high technology was from 1972.

[Question] Should not increased state support be used to counteract this?

[Answer] You cannot spend enough on support to revive a national economy which has fallen victim to slander. This cannot be financed. Naturally, you cannot lead the world in every kind of technology. There are areas in which you must be careful not to lose contact.

12552

CSO: 3698/548

## SCIENTIFIC AND INDUSTRIAL POLICY

### TAX BREAKS IN BERLIN FOR CONSTRUCTING, MODERNIZING BUILDINGS

Duesseldorf VDI NACHRICHTEN in German 19 Apr 85 p 10

[Article by H. Rieth: "Investment. Tax Breaks in Berlin: Security and Profitability Assured"]

[Text] What taxpayer is not interested in reducing his ever growing tax burden? Tax-saving investments make this possible. However, not all types of investments are clear-cut or risk-free for the taxpayer. There is also the danger that with the wrong kind of financing, many investment returns do not materialize.

Berlin loans, in accordance with section 17, paragraph 2 of the BerlinFG (Law for Promoting the Berlin Economy), represent an unchallenged and at the same time safe type of investment which provides tax advantages guaranteed by the legislature. These long-term, tax-saving investments are for constructing and modernizing buildings in West Berlin. The investing institutions, and thus loan partners, for these loans as per section 17 of the BerlinFG are the Berlin Pfandbrief-Bank (Mortgage Bank) and the Wohnungsbau-Kreditanstalt (Residential Construction Credit Institution) of Berlin, banks under public law for which the Land of Berlin assumes unlimited responsibility for liabilities. This explains why these investments are so safe.

By signing up to provide a Berlin loan, the investor can reduce his taxes by 20 percent of the loan amount--up to a maximum of 50 percent of his income tax due--for the year in which he signs up. This is true for all taxpayers regardless of tax bracket. Those who want to take the maximum advantage of the tax breaks must therefore sign up to provide a loan which amounts to 2.5 times their estimated income tax due. Expressed in figures, a DM 100,000 loan reduces the income tax due by DM 20,000 (or taking into account 9 percent church tax, for example, even by DM 21,800) providing that the income tax due amounts to at least DM 40,000 for the year the investment is made.

The return is also attractive when you take into account that the investor in effect pays in only 80 percent of the loan amount but gets back 100 percent and is guaranteed interest on the nominal amount (DM 100,000 in our example). The interest is guaranteed over the entire loan period of 25 years and is paid semi-annually together with the loan redemption payments.

Most taxpayers will say that that is all well and good but they do not have the liquid assets. In order to prevent insufficient liquidity from standing in the way of these tax advantages the legislature has allowed the possibility of financing section-17 loans on credit. According to this interesting and popular method, the investor provides a 25-year loan financed largely--up to a maximum of 80 percent--by a bank loan. To secure the loan and guarantee repayment the investor takes out a life insurance policy.

The interest and redemption payments for the Berlin loan, which already begin flowing back to the investor after 6 months, are used first to finance the interest on the bank loan and to pay for the life insurance policy. The bank loan is redeemed upon the sudden death of the investor or at the latest after 15 years when the life insurance policy reaches maturity. Any excess funds resulting, for example, from profit sharing in the life insurance plan reverts to the investor or his surviving dependents. Any shortfall of funds is covered by the still outstanding return payments on the Berlin loan. The full interest and redemption payments from the Berlin loan subsequently continue until the end of the 25th year.

There are other advantages in addition to the tax-saving aspect: The full value of both the interest on the borrowed funds and any exchange losses agreed upon in obtaining the bank loan are considered professional expenses for income from capital investments. The capital-yield tax based on the interest income from the Berlin loan is thus minimized.

Since no Berlin loans were available in 1984, many interested investors are now officially in line for the tranche in the early summer months of 1985. The volume of investments needed by the Berliners is noticeably less this time, however, than it has been in the past. Interested investors should therefore make their arrangements promptly.

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SCIENTIFIC AND INDUSTRIAL POLICY

ITALIAN PROPOSALS FOR PROMOTING INDUSTRIAL INNOVATION

Rome MONDOPARAI0 in Italian in November 1984 carries an article by Valdo Spini entitled "An Agency for Technological Innovation" which discusses two bills introduced in the Italian parliament. The bills propose setting up government agencies to promote innovation and research in small- and medium-sized companies. For the text of Spini's article, see pages 154-160 of the WEST EUROPE REPORT JPRS-WER-85-036 of 4 April 1985.

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## SCIENTIFIC AND INDUSTRIAL POLICY

### FRANCE: THREE-YEAR PLAN FOR TECHNOLOGICAL R&D

#### Plan Outlined

Paris LIBERATION in French 6 Jun 85 p 20

[Article by J-P. Dr: "Research Minister Seeks to Retrieve Lost Time"]

[Text] During the time he was minister of research, Jean-Pierre Chevenement had set things in motion: "Nationwide sessions," elaborate "show" to prepare mental attitudes, then the "orientation and planning law" passed in June 1982 for a period of 3 years. There is no question of a letup. The pressure is being maintained and even increased in certain domains with a slight bearing down on the accelerator, said Hubert Curien in substance yesterday before the Council of Ministers.

Actually, the minister of research and technology presented to his colleagues his "3-Year Plan for Technological R & D (1986-1988)"--a document that, according to the Government, "confirms France's resolute commitment to modernization" and, in addition, "illustrates the ambition she moreover proposes to her European partners with the Eureka project." Owing to the latter, our national expenditure on research and development is expected to reach 2.65 percent of GDP [gross domestic product] in 1988, and 3 percent by the end of the next 10 years, "thus positioning our country as one of the top scientific and technological nations." This is provided, of course, that the little piggies (of the opposition) don't gobble up this superb plan between now and then. But this sort of consideration does not enter into the reasoning on which our future is being built...

To attain this coveted 3 percent, the plan calls for an annual growth of 4 percent by volume of the civil R & D budget (1.6 billion francs)--a seemingly weak magic potion in the view of the Economic and Social Committee, which rendered its consultative opinion on this document on 29 May. This 4 percent represents "a minimum below which we must not drop under any conditions," the minister stated courteously before adding that 7 percent--the level that prevailed during the years 1982-85 and that enabled the overall national research effort to increase from 1.85 percent to 2.25 percent--"would have been desirable," thus acknowledging a criticism to which he responded by pointing out that, taking into account outpayment credits, the [proposed] increase will in fact amount to 7.5 percent in real value over 1985.



While the 1982 law has not fully attained its objectives, Hubert Curien nevertheless deems that the balance sheet to date is "incontestably positive." He is therefore continuing in the same direction, beefing up the effort in two of its aspects in particular in which France is still being outdistanced by its competitors:

--Research in the industrial sphere, distinctly more intensive in Germany, the United States and Japan, will be stimulated by fiscal incentives. The "research tax credit" will be doubled from 25 percent to 50 percent, and the ceiling raised from 3 to 5 million francs. This means that, beginning in 1985, an industrialist devoting, say, 5 million francs to research will receive a 50-percent reduction of his tax on 5 million francs of profits. The Economic and Social Board had greeted this measure with resounding applause; for the state, it will represent the equivalent of an expenditure of 700 million francs the first year;

--The number of persons engaged in research must be substantially increased. Researchers and research engineers in France currently number six per thousand workers, as compared with 8 to 10 per thousand in Germany, and 12 per thousand in the United States. Some 1,000 jobs must be created this year. The 3-Year Plan calls for increasing this figure to 1,400 per year for 3 years. This measure, which is aimed at "instituting a long-term, scientific employment policy" and guaranteeing "regular recruitment of high-quality personnel," is accompanied by the instituting of a "research leave" that is available to all employees of enterprises.

The 3-Year Plan also calls for a special outlay (amount not specified) to provide laboratories with research equipment (data processing equipment in particular). In addition, the Regions are to be more fully involved "in the evaluation and implementation of the research and technological development policy." Regional presidents will attend an annual meeting "to enable them to debate its aspects with the representatives of the state and of public bodies."

This bill, which has been approved by the Council of Ministers, is expected to be taken up by the Assembly prior to the end of its current session.

#### Ministers Approve

Paris AFP SCIENCES in French 6 Jun 85 pp 1-4

[Text] Paris--In governmental action in France from 1986 through 1988, research will occupy a high priority, since it is a means of modernizing the country (see AFP SCIENCES No. 456, 15 May 85, pp 1-2).

This was, in substance, the Government's decision when it approved, at the 5 June meeting of the Council of Ministers, the bill titled "3-Year Plan for Research and Technological Development" submitted to it by Mr Hubert Curien, minister of research and technology.

Two days before the meeting, Mr Laurent Fabius had already stated that his Government intended to make of research and advanced technologies "a real priority," research being "the leaven of the future."

The bill is intended to ensure that by the end of the next 10 years, allocations to research will have risen from this year's level of 2.25 percent to 3 percent of the GDP [gross domestic product], "positioning France among the foremost technological powers." According to the preamble to the bill stating the grounds for its adoption, it was important that the French outlay for research be increased even more than it has been these past few years, especially "at a time when we are proposing to our European partners the Eureka project, which is designed to provide our continent with an independent decisional capability in the domain of science and technology."

Over the next 3 years, the bill would ensure an increase in the civil R & D budget of 4 percent per annum in constant francs, and a real increase of 7.5 percent over 1985 when outpayment credits are taken into account, amounting a rate of growth three to four times faster than that of the GDP.

The Council of Ministers' communique and the text of the bill that is to be submitted to the National Assembly before the end of June state that the 3-Year Plan will pursue four principal objectives:

- Provide a real shot in the arm to industrial research and stimulate outlay by the enterprises themselves, with a view to rebalancing the funding of the national expenditure;

- Implement a long-term scientific employment policy that takes into account, beginning now, the foreseeable demographic changes, by ensuring regular recruitment of high-quality personnel;

- Provide laboratories with research facilities, positioning them at the level of their foreign competitors, particularly in regard to computerized data processing equipment and medium-heavy apparatus;

- Improve the evaluation of research and technological development programs to guarantee their quality and provide more extensive data as to the use of the resources allocated to them.

As to the funding of this policy, the 3-Year Plan calls for:

- Doubling the research tax-credit to enterprises, from 25 to 50 percent, and raising the ceiling from 3 to 5 million francs; this measure would be applicable to new expenditures made from 1985 on;

- A growth rate of 4 percent in the volume of credits in the BCRD [civil R & D budget] allocated to program authorizations and operating expenses, for each of the years 1986 through 1988; for 1986, actual appropriations allocated by the state to research will increase by more than 10 percent;

--Authorization to create 1,400 additional jobs under the BCRD each year for 3 years;

--Recognition of an individual's right to research, applying to all employees of enterprises, making available to them for this purpose a research leave modeled on educational leave;

--Enhanced involvement of the Regions in the evaluation and implementation of the R & D policy; an annual meeting attended by the regional presidents, enabling them to debate its aspects with the representatives of the state and of public bodies.

This bill has been the subject of a nationwide consultation with representative entities of the scientific and technical community and of the principal socioeconomic forces. It received a favorable vote on the part of the Economic and Social Council on 29 May (164 votes against 17 abstentions). It will be submitted immediately to the National Assembly, which will debate it prior to the end of its spring session.

The bill presented by Mr Hubert Curien calls for an increase of 10 percent in research credits for 1986.

The tax credit permitting enterprises to deduct half the sums they devote to research from their tax bill will be doubled. Thus a PME [Small- and Medium-Sized Enterprise] firm that invests 10,000 francs in research will be able to deduct 5,000 francs from its taxes. This deduction, which will cost the state 1.2 billion francs, is subject to a ceiling of 5 million francs per enterprise versus the previous one of 3 million francs.

In 1984, 1,600 enterprises benefited from this tax credit, the total of which came to 384 million francs. It will come to 450 million francs this year, and to between 1.1 and 1.2 billion francs in 1986. Of these 1,600 enterprises, 61 percent were PMI's [Small- and Medium-Sized Industries], attesting the strong incentive this credit represents for this type of enterprise.

Each year, 1,400 new jobs will be created in research, and an outlay will be provided to modernize the equipment of laboratories, whose research programs are to undergo a better evaluation. Commenting on this latter point on 6 June, Mr Curien pointed out that it was essential that this scientific jobs plan carry over even beyond the 3 years provided by the bill. Its startup is to take place very soon and is to be particularly vigorous, he said.

The minister also pointed out that Article 2 of the bill provides, among other things, for "the development of research in higher-education establishments, particularly in the technological domains." This is very important. It is in line with the recent decision by Mr Jean Pierre Chevenement, minister of national education, to increase the number of technological universities in France, where only one actually now exists, namely, that of Compiègne. The planned rate is one technological university per year.

"This will not be easy," said Mr Curien, but it must be done. "There are existing nuclei on which we must build." Research activities at these nuclei must be made sufficiently attractive to lure good professors and students, so as to avoid what too often occurs in France: Good laboratories surrounding one professor and ending up serving only his own research, without attracting many students to it.

Mr Curien emphasized that the effort being deployed by the state, and those being asked of the industrialists, must be added to by those to which the researchers commit themselves when they select with care the subjects of their research work, avoiding what Mr Curien called "xerographic activities," which consist of reproducing older work done elsewhere and modifying it to the barest extent necessary, to add to it but a single new element. It is this type of activity that ruins the image of research in the public mind and in that of the industrialists. "The public will not accept research as a necessary priority unless basic research activities are undertaken in all seriousness."

Under the 3-Year Plan a certain number of pump-priming programs instituted under the 1982 Research Orientation and Programming Law will be brought into sharper focus, realigned and reactivated.

Only one of these pump-priming programs is to be revised, namely, the one devoted to scientific culture and to French as a science language. The problem of scientific culture and that of French cannot be intermixed. What is needed in the case of the latter is not a pump-priming program but rather, and on the contrary, the publishing of "good scientific and technical books in French." A need for this exists, not only in Canada but also in the Third World countries interested in science and technology. "Scientific and technical publishing in French is fundamental."

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## TECHNOLOGY TRANSFER

### PHILIPS PLACED AT DISADVANTAGE BY U.S. HIGH-TECH EXPORT LAWS

Rotterdam NRC HANDELSBLAD in Dutch 4 Jul 85 p 10

[Article by Ben van der Velden: "'Official Excesses' Cause Lag Behind Competitors from Large Countries: Laws on Technology Export Hurt Philips"]

[Text] Eindhoven, 4 July--There are so many time-consuming formalities required for the export of high technology, stipulated in particular by American legislation, that Philips has as a result repeatedly missed out on orders amounting in the millions. In addition, permit procedures--described as "official excesses"--for everything having to do with computers have led to an extra amount of administrative duties for the firm.

What is involved is not exclusively the export of technology that can be used for military purposes to Eastern Europe and China. The 14 NATO countries and Japan cooperating in the Paris-based COCOM [Coordinating Committee for East-West Trade Policy] organization have drawn up a list of technology that as "strategic goods can be sent to communist countries only with special permission."

But even if the Philips branch in the FRG wants to send a computer purchased in the United States to headquarters in Eindhoven, and then it is decided in the Netherlands to send the machine on to Belgium, where the decision is later made to transfer it to the French subsidiary, then no less than six export permits are required.

#### Austria

Should it then be necessary to send the computer to the Philips branch in Austria, chances are good that the United States would block this transfer. This happens if the multinational cannot provide a sufficient guarantee that the technology will not slip into Eastern Europe by way of the "supposed or existing opening in Austria." With its many interests in the United States, Philips cannot at any rate afford a quarrel in a case such as this, according to the maxim that is applied in these matters.

One problem is the fact that all the countries associated with COCOM use the list of strategic goods as stipulated by the organization for their own national



legislative purposes. Thus, export permits must be requested in order to transfer goods from one COCOM country to another just as from a COCOM country to Eastern Europe.

#### Computer

If American components are assimilated into a computer, for example, permission for re-export must be requested again in Washington on the basis of the Export Administration Act. It is possible that the Netherlands might grant an export permit, but that the United States would refuse permission for re-export of a component in the machine.

It can also happen that Washington waits so long to grant permission for the re-export of a component that the order has already slipped through the fingers of Philips. It is pointed out at Philips that in such cases the Dutch government is of no assistance with its pleas to the American authorities because the Netherlands, just as other West European countries, does not recognize the extraterritorial effect of the American Export Administration Act.

It has happened that Philips in the Netherlands has forgotten to request American permission for re-export. This resulted in a situation in which the firm then could not meet obligations agreed upon by contract.

This case involved the sale of a machine with an American component to an Italian firm, from the Netherlands.

When the Italians requested a service guarantee for the American component (which Philips could not itself provide), the original American supplier did not receive permission to put this into effect in Italy. According to American authorities, the component in question could not be in Italy since a permit was never requested for transfer to that country.

#### Competitors

At a recent meeting on technology transfer in Ottawa, Philips' deputy director, N. Hazewindus, argued in favor of applying export restrictions based on security considerations to all NATO countries jointly and no longer to each country separately. He said that obstructions to the export of high technology have put Philips in a disadvantageous position with respect to competitors such as General Electric and Hitachi.

Unlike these firms, which are based in large countries, Philips must request a large number of permits for products appearing on the list of strategic goods. Philips, with national organizations in 60 countries, realizes only six percent of its total sales in the Netherlands.

Hazewindus said that export restrictions are forcing unnecessary expenditures on the firm, as well as a decrease in flexibility. In particular, he called the expansion of regulations for technology export and their stricter enforcement by the Reagan administration a critical issue for multinationals.

It is being said at Philips that the sluggish handling of requests for re-export permits by Washington can have the effect of interfering with competition. One official involved in the issue says that he knows of examples in which Philips was put into a detrimental position with respect to a competitor through waiting for American approval. But he refuses to say what these examples are and adds emphatically, "I am certain that it was not the intention of the American government officials to favor the other party. However, that's how it worked out in practice."

As a rule, officials at Philips do not like to talk about obstacles in the export of technology, because that is up to the national authorities. "The NATO countries apparently do not trust each other enough, and in so doing, they are making our life difficult. It makes no sense to fly in the face of this," it is felt.

#### Ministry

And yet, contact between Philips and the Ministry of Economic Affairs concerning export obstructions is very intensive. In discussing the products that should or should not be added to the COCOM list of strategic goods, the Dutch authorities cannot get by without the technical knowledge provided by industry, and by Philips in particular. Once the COCOM list is completed, industry, and especially Philips, is called in to translate into Dutch those technical terms which the Ministry of Economic Affairs does not know how to handle.

In The Hague, the many discussions with Philips representatives are seen as insistence by the multinational that export regulations for technology going to China be relaxed. At Philips, "the intensive contact with The Hague" is explained simply as a necessity in connection with requests for export permits to China "because Philips does not want to unintentionally act outside the law."

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TECHNOLOGY TRANSFER

PHILIPS ANTICIPATES LARGE INCREASE IN CHINESE SALES

Rotterdam NRC HANDELSBLAD in Dutch 19 Jun 85 p 11

[Article by Dick Wittenberg: "Sales Prognosis for China Again Adjusted Upwardly: Philips Is Doing Very Good Business"]

[Text] Eindhoven, 19 June--For the second time in 6 months, Philips has upwardly adjusted its sales prognosis for the People's Republic of China. This was confirmed by the vice-president of Philips, C. van der Klugt, after the visit by Chinese Premier Zhao Ziyang to Philips headquarters in Eindhoven.

It was only in March that Van der Klugt declared that "if all goes well, Philips sales in China will climb over the next 5 years to one billion guilders." Yesterday he said that this level of sales will possibly be reached as early as within 3 years. Last year's sales for Philips in China amounted to almost 200 million guilders, a doubling with respect to 1983. "In a couple of years, we will be at a sales level in the People's Republic [of China] for which we needed 20 years to achieve in other countries," Van der Klugt stated with satisfaction.

At the moment, Philips has pending orders in China amounting to almost two billion guilders. According to Van der Klugt, there is the prospect of another six to eight new contracts. This includes establishing joint ventures in the areas of fiberglass cable, lighting and process management. There is also talk of future assignments. Last year, Philips walked away with an order amounting to 70 million guilders for supplying the machinery and know-how necessary to make possible the yearly production of one million refrigerator compressors at a plant in Peking. Van der Klugt said that this contract will probably be followed by the establishment of a joint venture for the manufacture of refrigerators.

Yesterday the Dutch multinational announced that Philips is to cooperate with the Chinese in setting up a plant for color picture tubes and reflective reels in the city of Nanjing. This will be Philips' third joint venture in China and, according to Van der Klugt, "the most important, most extensive and most complicated one." This plant, which will have an initial yearly capacity of 1.5 million units, is to produce the new, flatter picture tube, a technology that Philips itself has only recently put into production. "I believe that we have never before transferred technology so quickly," Van der Klugt said.

The vice-president said that working capital of between 150 and 200 million guilders is necessary for the new picture tube plant. Philips assumes a 30 percent share in the business, while the Chinese get an interest of 70 percent. According to Van der Klugt, the remittance of profits has been "clearly and properly arranged." "We have absolute guarantees that we will be paid for both the capital and the know-how that we are furnishing." Philips hopes that the joint establishment of a picture tube plant will lead to a joint venture in the manufacture of color television sets. "But that is not automatically the case," Van der Klugt explained. "Although we do view the picture tube plant as an important bridgehead."

According to Philips President Dr W. Dekker, the firm has no plans to establish 100 percent subsidiary companies in China. "We feel that it is safer to focus first on joint ventures," Dekker said. "We want to first acquire a great deal of experience." Van der Klugt also explained, "We don't want to bite off more than we can chew all at once. First we must build up expertise." The vice-president pointed out in addition that the Chinese government does not yet allow companies that are entirely in foreign hands.

According to Van der Klugt, the successes of Philips in China are particularly satisfying since they are being achieved amidst fierce competition from the Japanese. "The Japanese electronics producers have assigned the highest priority to the Chinese market," Van der Klugt said. "Our big advantage is that we have demonstrated our readiness to transfer technology," the vice-president said. "We can point to plants in 60 countries where we have transferred technology. On the other hand, the Japanese cannot name one single company. All the plants that the Japanese have set up elsewhere are still dependent on Japanese supplies."

And yet the Chinese are not entirely satisfied with the cooperative efforts by Philips in transferring know-how. Packaged in a speech full of affabilities and courteous remarks, Chinese Vice-Premier Tian Jiyun said over lunch that Philips should assume a more liberal attitude towards technology transfer. He also said that Philips' prices ought to be more competitive and that loans should be made under more favorable conditions. Van der Klugt did not appear afterwards to be aware of critical undertones. "If I were vice-premier I would have said the same thing," the vice-president said.

In addition to a video disc system and a compact disc player, Philips presented the Chinese delegation with two one-year scholarships for study at the Dutch University of Business Administration at Nijenrode and at the Philips International Institute. Several months ago Nijenrode concluded an agreement with the Shanghai Institute for Foreign Trade providing for an exchange of students and staff members. According to Mr F. Schijff, chairman of the Nijenrode board of trustees, the first few Chinese students will be studying in the commercial management program in the coming school year. In addition, five Chinese students will soon be taking part in a summer course lasting several weeks.

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## TECHNOLOGY TRANSFER

### FINLAND: HIGH-TECH INDUSTRIES CONSIDER 'TECHNOPOLIS' CONCEPT

Helsinki HELSINGIN SANOMAT in Finnish 20 Jun 85 pp 48-51

[Article by Jukka Ukkola: "Good Bye Silicon Valley, Welcome Technopolis"]

[Excerpt] Electronics and other areas requiring new professional skills and creativity are more promising sources of employment in Finland as well as elsewhere in the world. The newest trend in accommodating the production of such areas is the Japanese technopolis method, concentration into a few major hubs in various parts of the country. Even without this procedure, several firms have already stretched into dipoles, in which production is located in one branch, and planning, marketing, and management are located in another.

The well-known Silicon Valley on America's West Coast is already an obsolete model for the location of high technology.

Even though concentration in a silicon valley on Finland's southern shore is currently the rage in discussions in Finland, the government is consciously working in a contrary direction, it is attempting to disperse production.

The word for tomorrow is technopolis, a group of communities in various part of the country planned for the benefit of new industry in particular.

The technopolis concept is originally from Japan and it is also being applied in England. In Japan there are approximately 50 areas which are being developed into "interesting cities". They are being provided with educational facilities, decent housing, and generally everything that a technological population needs. Industry, research institutes, academicians, and residential areas are in a close proximity to each other.

The area policy being planned and carried out in Japan will not, indeed, as such be transferred to Finland, says Assistant Section Chief Antti Uusi-Hakala of the Interior Ministry's area policy section, who has become familiar with this issue. "But the principle is similar: there must be sufficient enticements to attract people to an area."

Even in Japan the technopolis concept is still quite new. The plans will probably not be final until the next century even though 1990 is the goal for the establishment of such centers.



Plans are progressing well for a similar model in Sweden. In accordance with the government's proposal, biotechnics in the future will be located in the area of Umea, datatechnics in Lulea, and space technology in Kiruna -- thus all at a latitude corresponding to the provinces of Oulu and Lapland on the Finnish side.

In Finland today's truth is still far from area centers. High technology is highly concentrated.

Approximately half of the labor force of the electronics area is located in the vicinity of the capital city. In addition to the Helsinki-Salo axis, only the Oulu area is considered to be a concentration of high technology in the opinion of Uusi-Hakala.

In his opinion the electronics firms appearing here and there in developing areas are still exceptional events, whose effect in the future will depend on whether they will be able to create new production around them.

"Generally, there are no very real prospects at this time for the dispersion of high-tech production. Production is becoming stronger there where it already exists as well as in areas in which there is a strong economic base and the conditions to support a production requiring research.

"Halikon Valley Not Enough"

Some communities have begun to apply the technopolis concept with their own initiative. For example, Oulu has declared itself a city of technology. It is striving to create conditions for the production of electronics and other high technology and it has even got its idea off to a good start. Similar plans exist in certain other communities also.

The government also wants to see this type of a trend. "No mass movement out of the vicinity of the capital city cannot yet be observed, but an attempt is being made to make developing areas more attractive by reforming area policy. Various forms of state support are being increased for those high-tech firms which locate in developing areas. Otherwise, we would merely be left with a 'Halikon Valley'," says Uusi-Hakala.

Many practical means are available. For example, information on the adoption of new technology is being increased for firms in developing areas. Start-up loans have been contemplated as an innovation for competent individuals for the purpose of establishing a firm. The work of VTT's [State Technical Research Center's] area units is being developed. It is possible to increase state aid intended for the payment of provincial export agents. Training can be increased and dispersed in vocational institutes and commercial fields in particular.

"We are not exactly travelling the same path with Martti Tiuri -- on the contrary, we consider that the electronics industry is very well suited to developing areas since it is not exactly dependent on distances and there is not very much to be transported."

## Bipolar Enterprises

Even though a conscious technopolis-development is only just beginning in Finland, we "ourselves" have already observed clear signs of the hub concept.

This becomes apparent in the internal distribution of labor in a firm. More and more enterprises are dipole or bipolar in their structure. A firm has operations in at least two locations.

New hubs are being created in two directions. Many firms which have been established in developing areas are transferring the perimeter of their planning and marketing divisions to a third spoke. But there are also examples to the contrary: The know-how of the capital city area is being applied to production in developing areas, most frequently in up and coming centers.

Another one of those homes for a firm in one form or another is there where "everything else" is -- in Finland typically in the capital city area. From there open up the best markets to foreign countries, there one can find the necessary services for administration and sales, and there it is easier to advertise, present, and show.

But a firm's other hub -- generally the production plant -- can be in a much smaller center such as Oulu, Varkaus, Iisalmi, Kajaani, Kemijarvi...

Naturally, firms do not locate their plants in the "backwoods" merely for charitable purposes or a friendly propensity toward area development. They are attracted there primarily by three circumstances: a sufficient and trained labor force, a proximity of subcontractors as well as frequently a kind of "spiritual tie" such as a desire to return to one's home district on the part of the firm's management, which is a reality in today's business life.

Such a model is suitable not just to the electronics industry, but also to other fields in which a concept and planning irrespective of location are important and the transport costs of raw materials and products are not too important.

It is those "spiritually oriented" firms requiring specialized vocational skills which will be the most probable creators of new jobs in tomorrow's Finland as mechanization reduces the need for a labor force in tasks at the physical performance level.

### The Knowhow of a Hungry District

Industrial Consulting Agency Oy [Inc.] (ICA), which manufactures current feeding systems for micro-computers, is one of the most recent high-tech firms which has adopted the dipole approach to its operations. Together with Keraspo, a development company of Kera, a Helsinki firm recently decided to locate its new electronics plant in the middle of Kajaani, "a hungry district".

Why?

There are many reasons, explains Pekka Piiparinen, the firms marketing director. In principle it is not good that everything is concentrated only in the capital city area and that abroad Finland is only known as Helsinki.

A more practical explanation is that there is a trained labor force in Kainuu since there are several similar firms in this area.

"It is clear that such a plant cannot be built in a completely undeveloped backwoods area. Indeed, there are axes and men everywhere, but where are the carpenters?"

Subcontractors, sheet metal shops, which are needed by the electronics industry, have accumulated in the Kajaani area since the Kostamus project. "The order of priority is that first the environment is needed. If this is perceived in the leadership of the municipality, industry will follow subcontractors and a labor force," says Piiparinen.

In the case of ICA familiarity was a special reason. The firm has used Elektrostep Oy, the successor to Finnvalco from Sotkamo, as a subcontractor for many years already. "It was natural that this familiarity contributed to the decision to locate in the same area."

"Undeniably, the advantages of a developing area represent a carrot in such a decision, but one cannot act exclusively on their basis."

ICA's product development and marketing will remain in Helsinki. They must be kept there, says Piiparinen. "Strategies are developed here, it is easier for foreign guests to come here, and everything happens here. One must live according to the realities of life."

But the construction of a plant in a more distant location has many advantages in Piiparinen's opinion. There production can be concentrated in its own field without the daily routine of central management, excessive supervision, and other pressures. Efficiency increases. Not even internal information and communication is improved by the fact that everything is under one roof if it is not otherwise in order.

#### Money Alone Is Not Enough

For example, Finland's most northern city of Kemijarvi is also suitable for the dipole concept. In recent years several production plants representing new technology have been built there while their other branch in one form or another is located in Southern Finland.

In Kemijarvi the concept is that the needs of an enterprise are to be satisfied in ways other than just building walls around a plant.

"Money alone is not enough, especially for large enterprises -- all the stops must be pulled," says business agent Kari Vayrynen.

Pulling out all the stops in Kemijarvi means training, above all. This means a great deal since firms needing specialized skills will hardly come to the community merely because of a "raw labor force" -- this can be found in abundance in every developing area. Unemployment in Kemijarvi continues to be more than 10 percent although the situation is the best in Northeast Lapland.

Kemijarvi has obtained training for which there is a demand: electronics, fur processing, clothing production.

The results are often seen in production plants. For example, the municipality's second largest industrial employer, Salcomp Oy, was established 10 years ago in Kemijarvi primarily for the reason that there was a labor force there which was undergoing training.

Salcomp is a sister company of Salora so that its headquarters is at the other end of Finland, in Salo. In practice this means a journey of 1,600 kilometers when personal meetings become necessary -- and, of course, the transporting of products to markets.

"But there is no reason to be concerned with transport costs since they have already been precisely calculated in the decision to locate a plant in Kemijarvi," says Kari Kiiskinen, director of Salora's components group. He, however, criticizes the State Railways for changes in its tariff policies and transport services.

In 10 years Salcomp's plant has become an employer of nearly 200 people with a sales turnover of approximately 50 million markkaa, a full one-third of the total sales turnover of the components group.

The plant began operations by primarily manufacturing television tuners, but over the years the product selection has grown to include many other items such as electronic stamps intended for the mail, cable defect sensors, and welding rectifiers, all so-called high technology.

Approximately one-fourth of the production goes for export -- for example, they have succeeded in conquering the television tuner markets from the Japanese.

Salcomp's auxiliary structure was christened in the summer, which nearly doubles the production facilities. The expansion was constructed by Kemijarvi's industrial section. It cost 3.5 million markkaa, and Salcomp will amortize the sum in connection with rental payments.

"We continued here since we were here from before and business has gone well," says Kiiskinen. "Initially, there was no tradition of an electronics industry, now there is."

Salcomp is in need of mechanics in the vicinity. Electronic equipment needs skins, covers, and many other small components. A covering soldered together with a soldering iron is not sufficient, it must be a quality job. "Mechanics is not exactly a bottleneck since it is brought in from the south. If the



supply were closer, we would take advantage of it," says Plant Director Kari Vuorialho.

Peru--Singapore--Tokyo--Kemijarvi

Torstai Oy began operations also at the same time as Salcomp. It operates in a completely different area -- fashions -- but its operations are also based on high-level specialized skills. Fashion designer Ritva Kellokumpu put in her time for others until she established her own company with her husband Jaakko for the manufacture of leisure clothing in Kemijarvi, her husband's hometown.

Now after 10 years Torstai is selling its trade-marked product, "club a:n", on all the continents except for Africa and has found its way into the markets of the Europe's top department store chains.

In the last year Ritva Kellokumpu has travelled to Singapore, Peru and twice to Japan to find ideas. The sales turnover of the firm is approximately 23 million markkaa and the plant employs about 100 residents of Kemijarvi.

Jaakko and Ritva Kellokumpu are slightly contemptuous of those who express amazement at locating a firm based on fashion in a remote developing area.

Torstai started originally from the concept that the marketing area is the whole world so that the location in Finland was not of much significance. In the first year of operation 90 percent went to exports, later the proportion of domestic sales has increased to approximately half of total production.

"At first we had to become known abroad before we could say in Finland that we are from Lapland. People tend to have the impression that the only thing that can come out of Lapland are Lapp hats and other ethnic products," says Managing Director Jaakko Kellokumpu.

"Helsinki Is Nearest Place"

Torstai is not actually dipole in its organization since it does not have a "main office" in the capital city. However, there are clearly two hubs in its operations since Helsinki is an inevitable gateway to the world for the firm.

"Sales must be directed through this center. It is a waste of time to attempt to sell directly to Murmansk from Lapland since trade is, however, conducted through Leningrad. Or even if we sell to Rovaniemi -- a distance of 80 kilometers from the plant -- transactions are conducted in Helsinki. In Finland Helsinki is simply the closest place."

The geographical distance is felt in Torstai's operations in that trips to "places" take time and money. They are, however, necessary since the north is lacking in suitable artists, as Jaakko Kellokumpu names display architects, organizers of fashion shows, compilers of brochures, models, photographers, choreographers, graphic artists -- generally, all the specialized services that a fashion firm needs.



"The provincial arts committee has concentrated only on entertaining the people and dealing with amateurs even though the services of applied arts should be increased," complains Kellokumpu.

He is not satisfied with the local press either. His clippings represents a pile of full-page auto ads in which Japanese, German, and other country's cars are praised with prominent displays of their trademarks in every picture.

Another pile represents articles about local enterprises. Generally, they talk about difficulties and relate sad stories, the enterprises are depicted in gloomy sounding terms, and every effort is made to conceal what is really happening.

"Why is there no appreciation of local efforts? Why must confidence be sought from somewhere else?" asks Kellokumpu.

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TECHNOLOGY TRANSFER

BRIEFS

FOKKER-CHINESE COOPERATION--Schiphol, 19 June--The president of the board of directors of Fokker, F. Swarttouw, has made an offer to Chinese Premier Zhao Ziyang to cooperate in the construction of aircraft. Fokker is ready for a form of industrial cooperation in this domain without there being at present any clarity concerning exactly what shape it should take. Fokker has been conducting surveying operations in China for a year. Prior to that, the aircraft manufacturer was not allowed into the country as a result of the Taiwan affair. "We couldn't even get a visa," according to Swarttouw. In order to open a potential production line in China, he sees it as a possibility that Fokkers will first be sent to China in assembly kits. The president of the board of directors of Fokker indicated that at least a hundred machines would have to be purchased in order to set up a full-fledged assembly line. Swarttouw: "Otherwise there's no point in it." Fokker is, moreover, well aware of the fact that the improvement of harbors and of the transportation infrastructure is at the moment a priority among the Chinese leadership. Fokker sees financing as another problem. Swarttouw: "Let's say China wants 200 Fokkers. They cost 25 million guilders a piece; just calculate that." The head of Fokker thinks that successfully cultivating the Chinese market will take a considerable number of years. [Text] [Rotterdam NRC HANDELSBLAD in Dutch 19 Jun 85 p 11] 12271

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